

**User's Manual**  
for the  
**Cranex Excel**  
**Cranex Excel Ceph**  
and  
**Cranex BaseX**

Cassette version  
(for film and imaging plates)



Medical Device Directive  
93/42/EEC

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User's Manual for the  
Cranex Excel, Cranex Excel Ceph and Cranex BaseX

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# 1. The Excel, Excel CEPH and BaseX x-ray units

## Introduction

This manual describes how operate the **Cranex Excel**, **Cranex Excel CEPH** and **Cranex BaseX** dental x-ray units.

The **Excel** is a panoramic dental unit that can take full and reduced width panoramic exposures, sinus exposures, partial panoramic exposures and TMJ exposures.

The **Excel CEPH** can take the same range of panoramic programs as the Excel, but includes a cephalometric unit.

The **BaseX** is a simplified version of the Excel. It can take full and reduced width exposures and sinus exposures. In addition, height adjustment is manual and not motor driven as it is with the Excel.

All versions use conventional film or imaging plates as the image receptor.

Please read these instructions carefully before using the x-ray unit.

## Using this manual



All key illustrations indicate that the key must be pressed.



A white circle indicates that the indicator light is on. When the light is on it indicates that the value or setting is on or has been selected



A black circle indicates that the light is off and the value or setting is off or has not been selected.

## Warnings and precautions

- These dental x-ray units must only be used to take dental and, where appropriate, cephalometric x-ray exposures. These dental x-ray units must not be used to take any other x-ray exposures.
- The x-ray unit or its accessories must not be modified, altered or remanufactured in any way.
- The x-ray unit may be dangerous to both patient and operator unless safe exposure values are used and correct operating procedures are observed.
- As radiation safety and protection requirements vary from country to country and state to state it is the responsibility of the operator to ensure that all local and national radiation safety and protection requirements are met.
- When taking exposures operators must protect themselves from radiation.
- When taking exposures operators must stand at least two metres (six feet) from the patient.
- Operators must be able to see and hear the patient during an exposure.
- Operators must be able to see the exposure warning lights and hear the exposure warning signal during exposures. If the x-ray unit is located in such a position that the operator cannot see the exposure warning lights, an external exposure warning light must be used. Contact your dealer for help.
- Avoid taking exposures of pregnant women.

- If you are using film as the image receptor, never leave the film cassettes open in daylight.
- If you are using imaging plates as the image receptor make sure that the imaging plates, imaging plate cassettes and imaging scanning device are compatible with each other.



## Check list before using the unit

### General

- Read and familiarize yourself with the Warnings and Precautions in the introduction.
- Make sure that you are fully acquainted with the relevant radiation protection measures.
- Make sure that all the required radiation protection equipment, such as radiation screens, are of the approved type and, where necessary, correctly installed.

### If you are using film

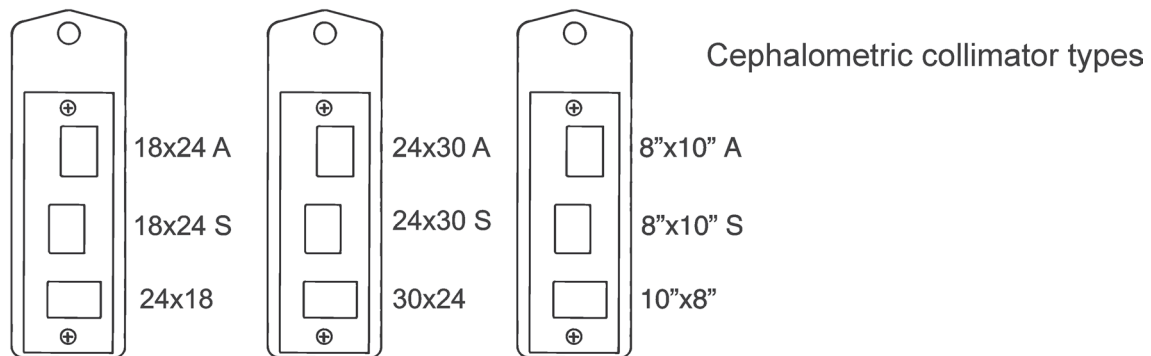
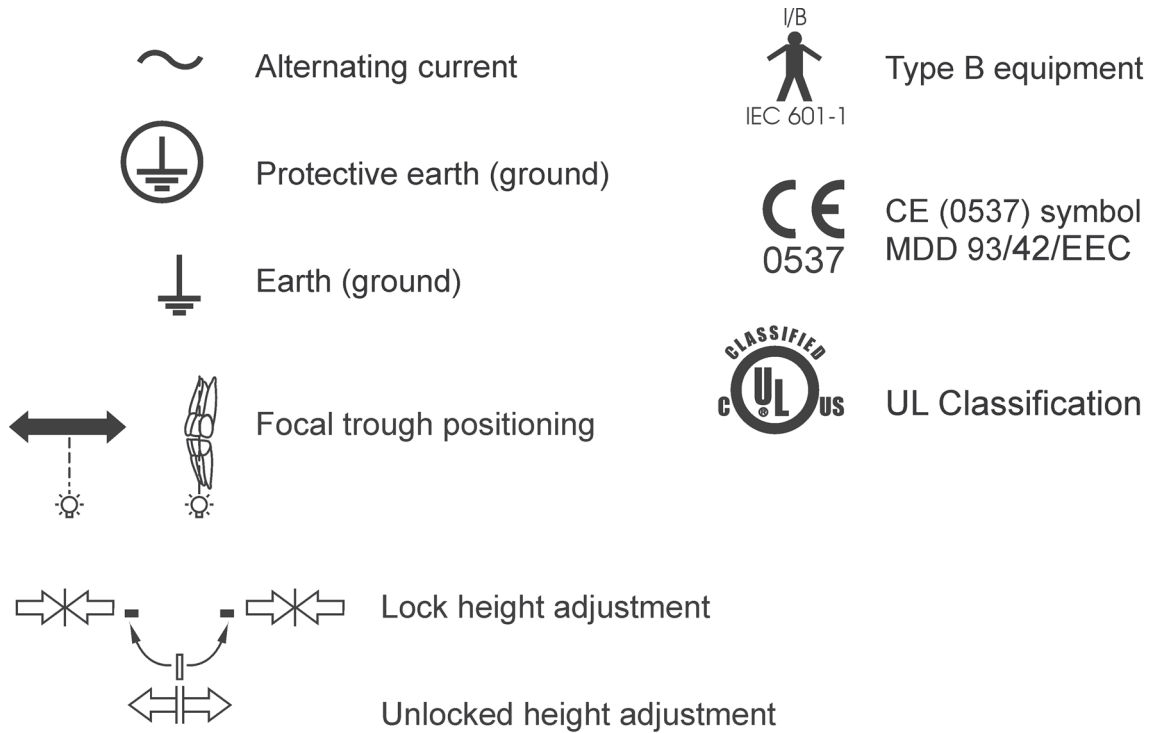
- Make sure that the film processor you plan to use is in working order and ready to use.
- Make sure that the processing chemicals in the film processor are fresh and are at the correct processing temperatures and concentrations.
- Make sure that the safelight in the darkroom is the correct one for the film you are using.
- Make sure that the film you are using is fresh. Do not use old film.
- Make sure that the film and cassettes/intensifying screens you are using are compatible. Do not mix films and screens of different colour sensitivity.
- Make sure that the intensifying screens are clean and not scratched. If they are scratched do not use the cassette.

**If you are using imaging plates**

- Make sure that the imaging plates that you are using are compatible with the imaging plate cassettes.
- Make sure that the imaging plate scanning device you are using is designed to scan the imaging plates you are using.
- Make sure that the imaging plates are clean and not scratched or damaged. If they are, do not use them.

## Symbols that appear on the units

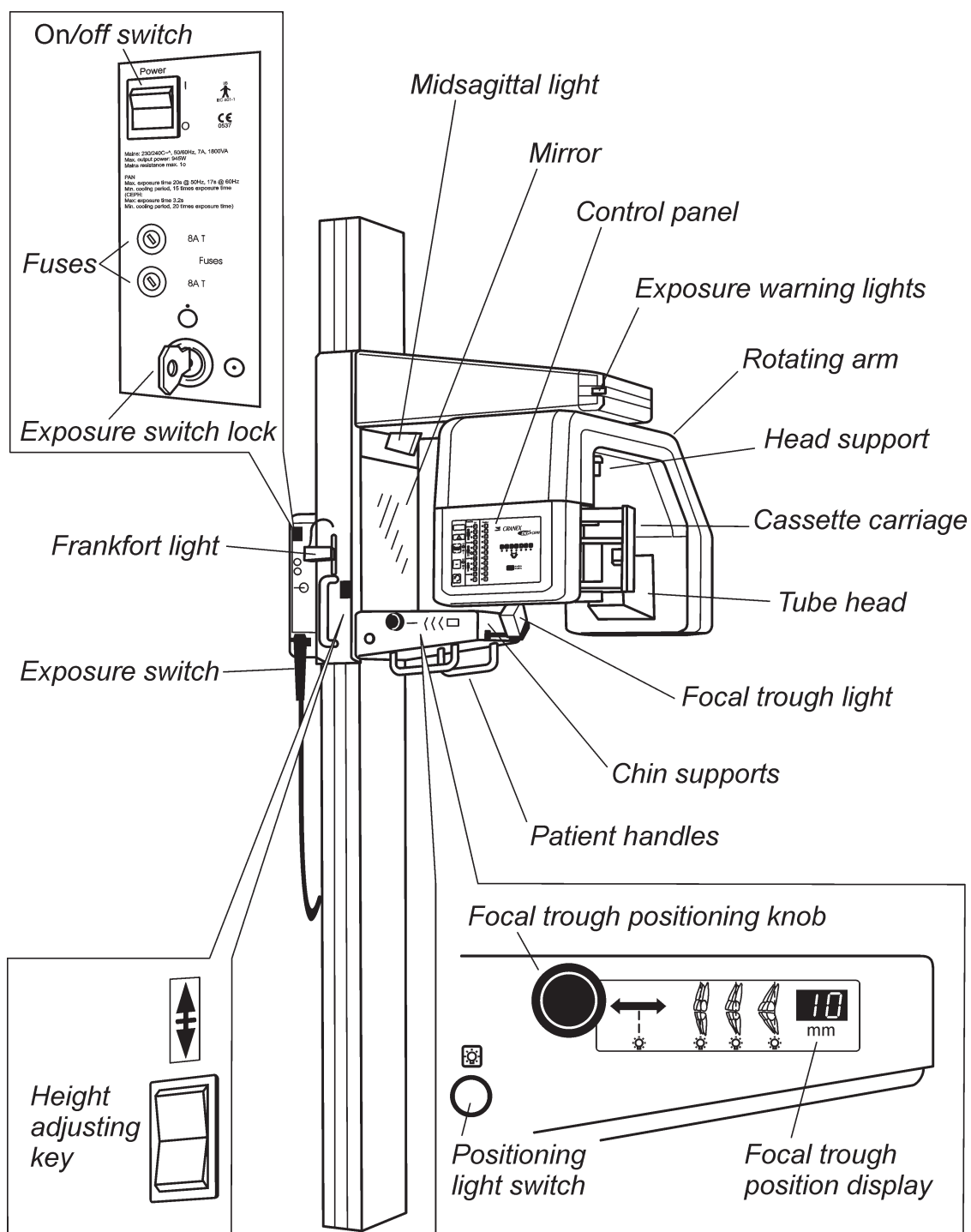
|  |                           |  |   |
|--|---------------------------|--|---|
|  | Exposure switch locked    |  | Test exposure                                 |
|  | Exposure switch unlocked  |  | Panoramic return                              |
|  | On or enabled             |  | Positioning lights                            |
|  | Off or disabled           |  | Exposure switch                               |
|  | Protection light          |  | Panoramic exposure                            |
|  | Spinal compensation       |  | Reduced width panoramic exposure              |
|  | Milliampere selection     |  | TMJ exposures (outer)                         |
|  | Rotating unit return      |  | TMJ exposures (inner)                         |
|  | Adult male kV selection   |  | TMJ exposures                                 |
|  | Adult female kV selection |  | Partial exposure<br>Patient's left-hand side  |
|  | Child kV selection        |  | Partial exposure<br>Patient's right-hand side |
|  | Frankfort plane light     |  | Frontal exposure                              |
|  | Radiation warning         |  | Height adjustment                             |
|  |                           |  | Head supports open                            |
|  |                           |  | Head supports closed                          |
|  |                           |  | Dangerous voltage                             |



Cephalometric cassette positioning marks

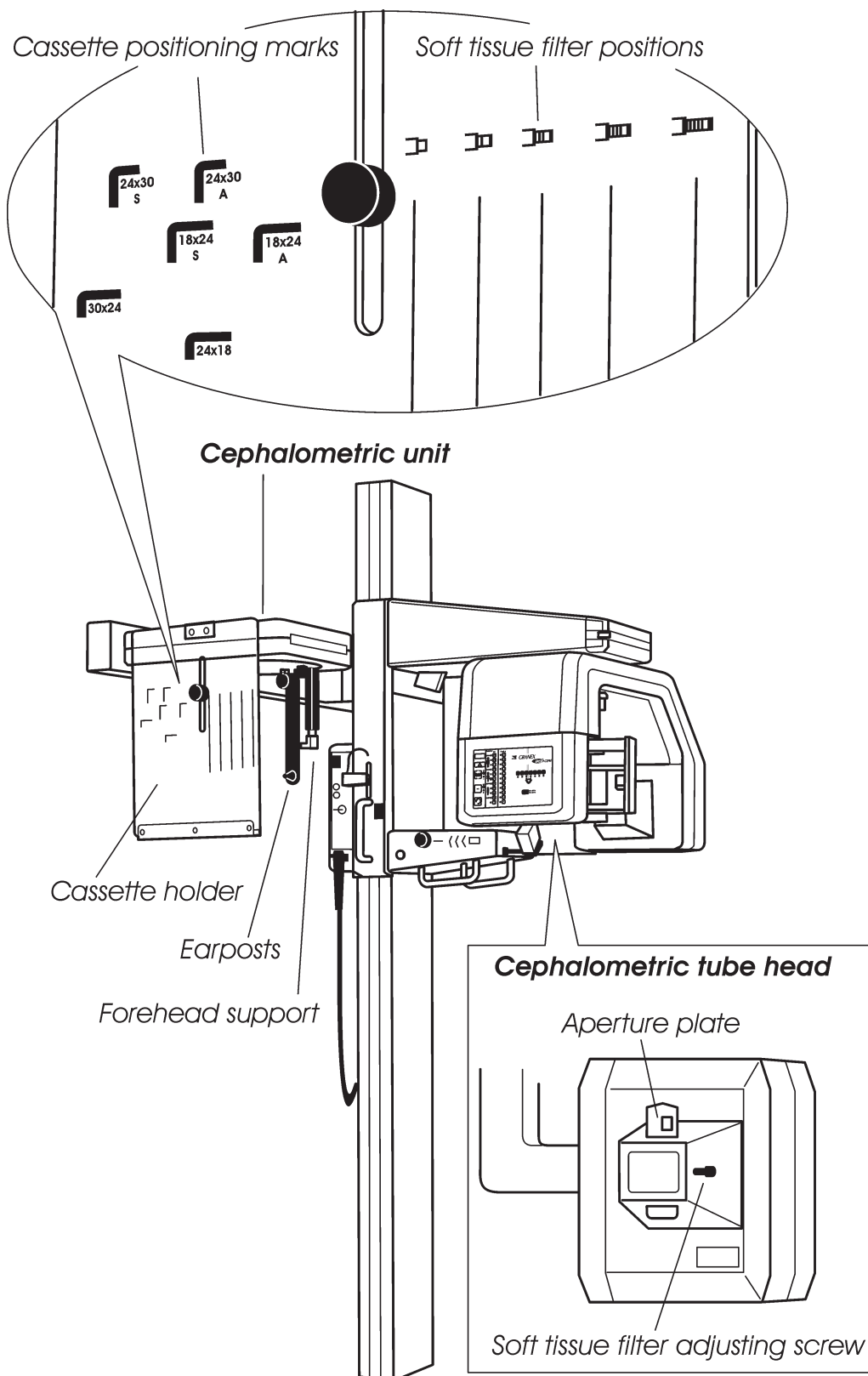
## 2. Unit description

### The Excel

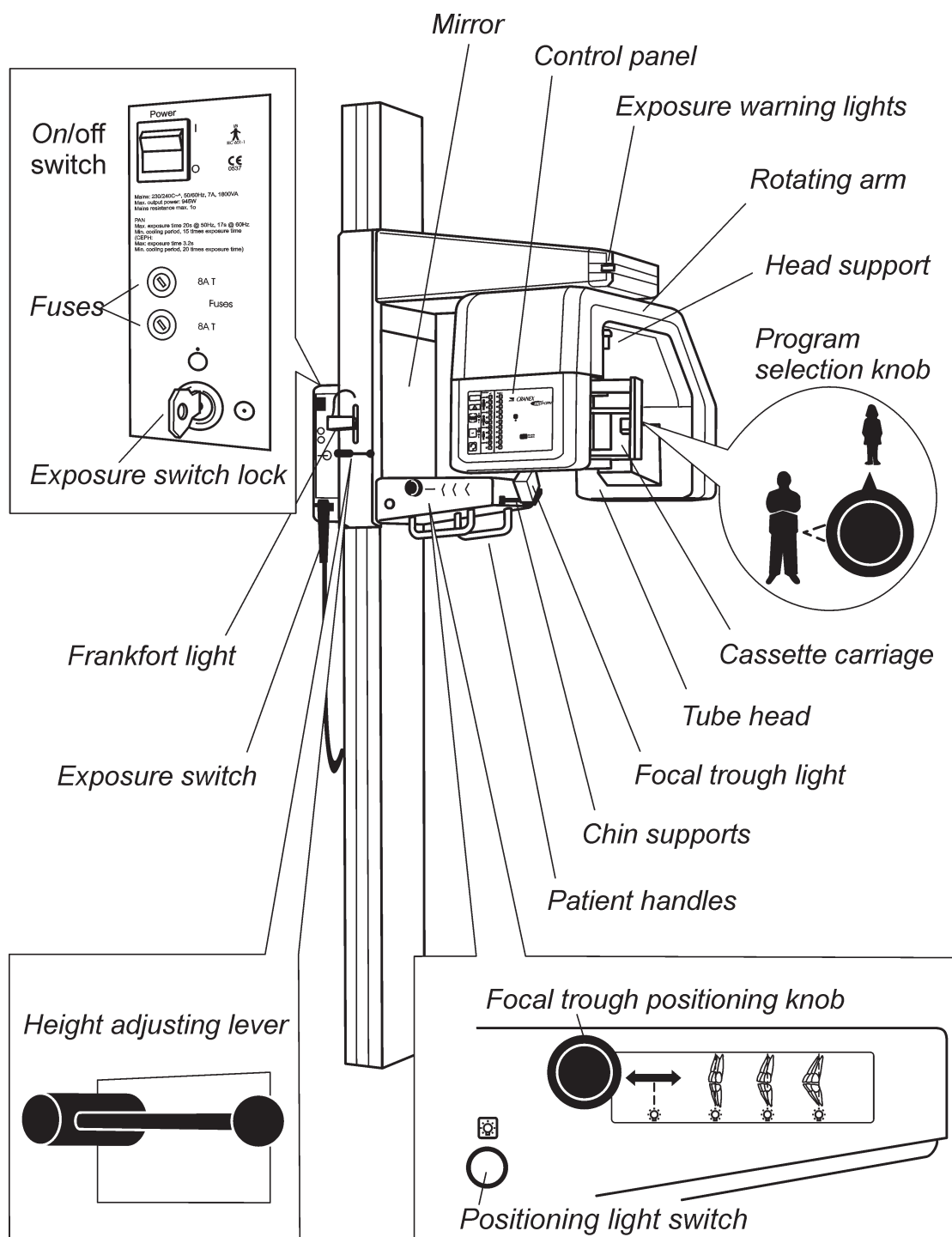


## The Excel CEPH

The Excel CEPH is the same as the Excel but includes a cephalometric unit



## The BaseX



## The Control panel - Excel and Excel CEPH

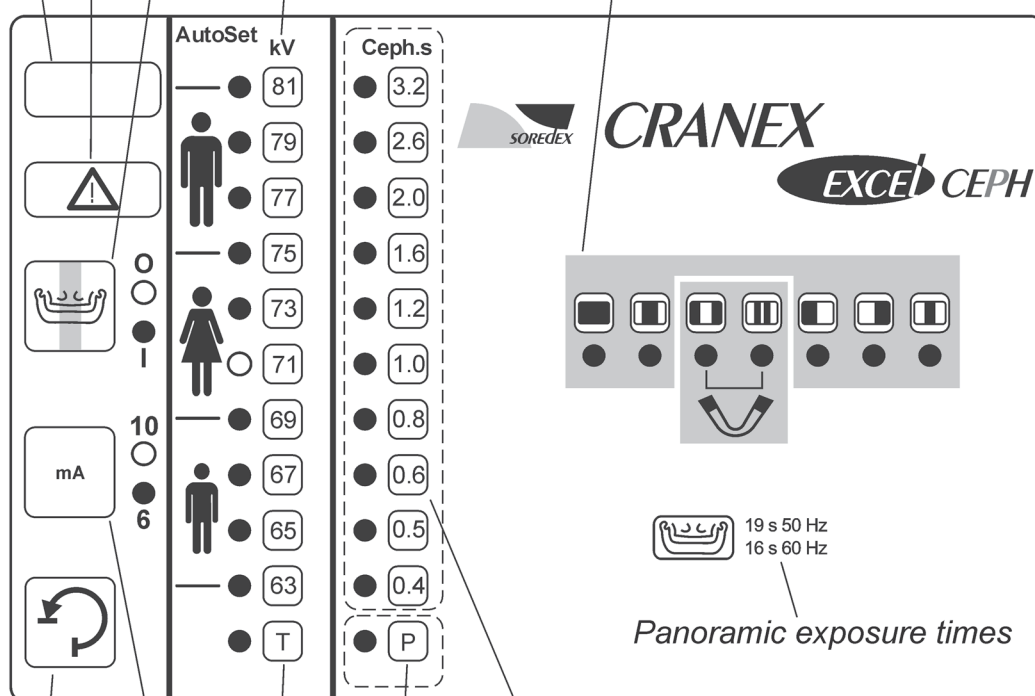
*Ready light - Comes on when the unit is ready to take an exposure*

*Protection light - Comes on if there is a problem with the generator*

*Compensation key - adjusts exposure value for spinal vertebrae*

*kV selection keys*

*Program selection keys*



**Excel CEPH only**

*Exposure time (in seconds) for cephalometric exposures*

**Excel CEPH only**

*Panoramic (P) key - press this key then the Return key to drive the rotating unit back to the panoramic position and mode*

*Test (T) key - operates the unit without x-rays*

*mA key - selects mA*

*Return key - drives the rotating unit to the ready position*



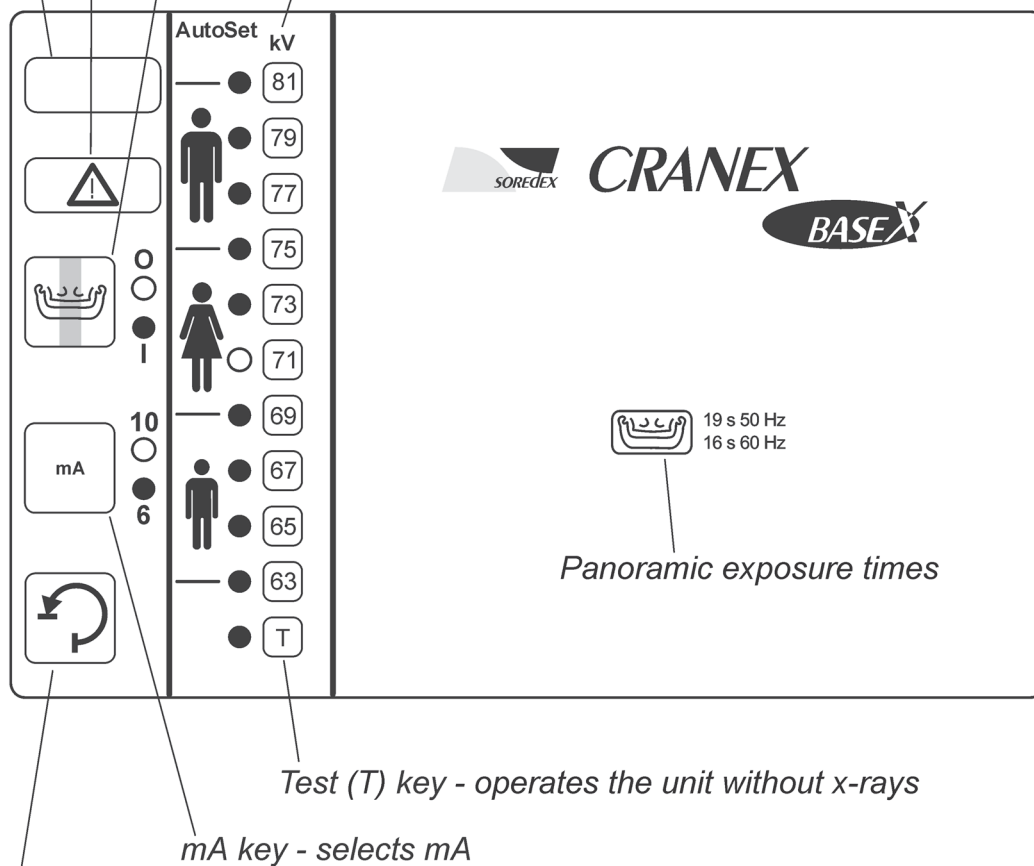
## The Control panel - BaseX

*Ready light - Comes on when the unit is ready to take an exposure*

*Protection light - Comes on if there is a problem with the generator*

*Compensation key - adjusts exposure value for spinal vertebrae*

*kV selection keys*

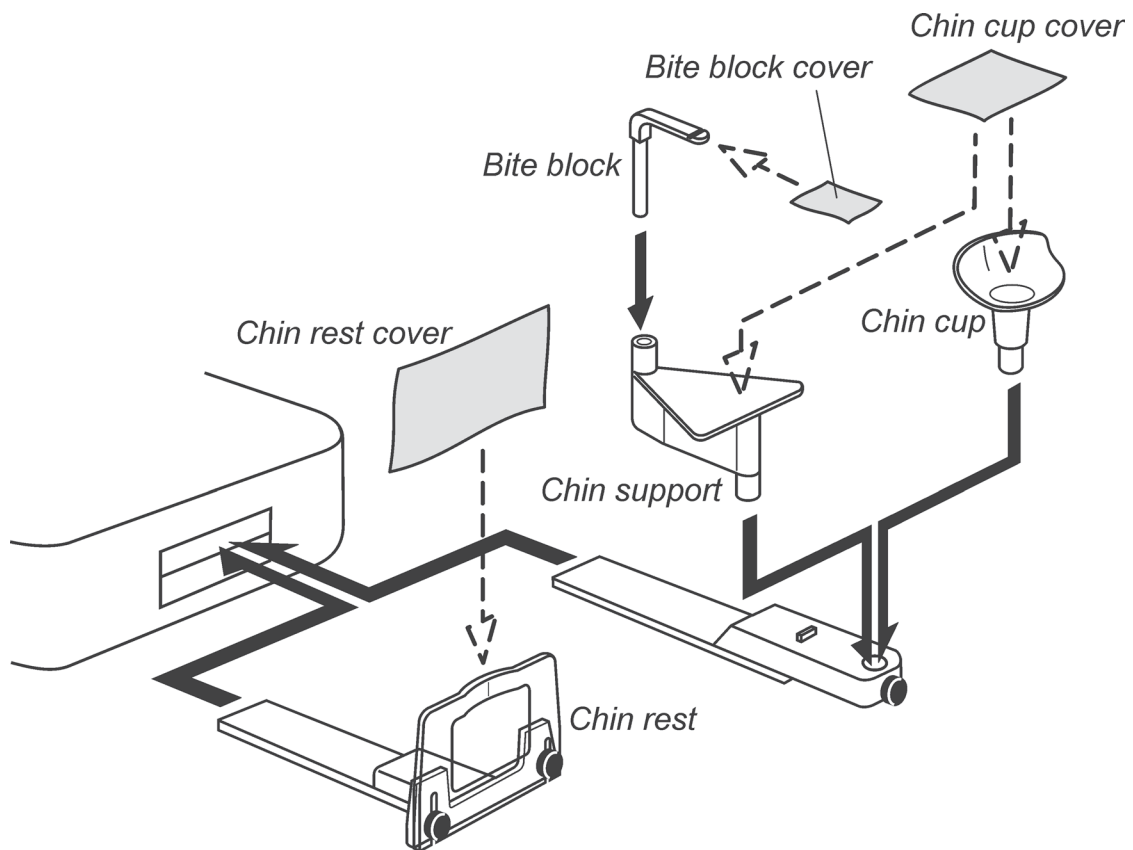


*Test (T) key - operates the unit without x-rays*

*mA key - selects mA*

*Return key - drives the rotating arm to the ready position*

## Chin Supports

**WARNING!**

*Always use the disposable covers with the chin supports*

## 3. Using the Units

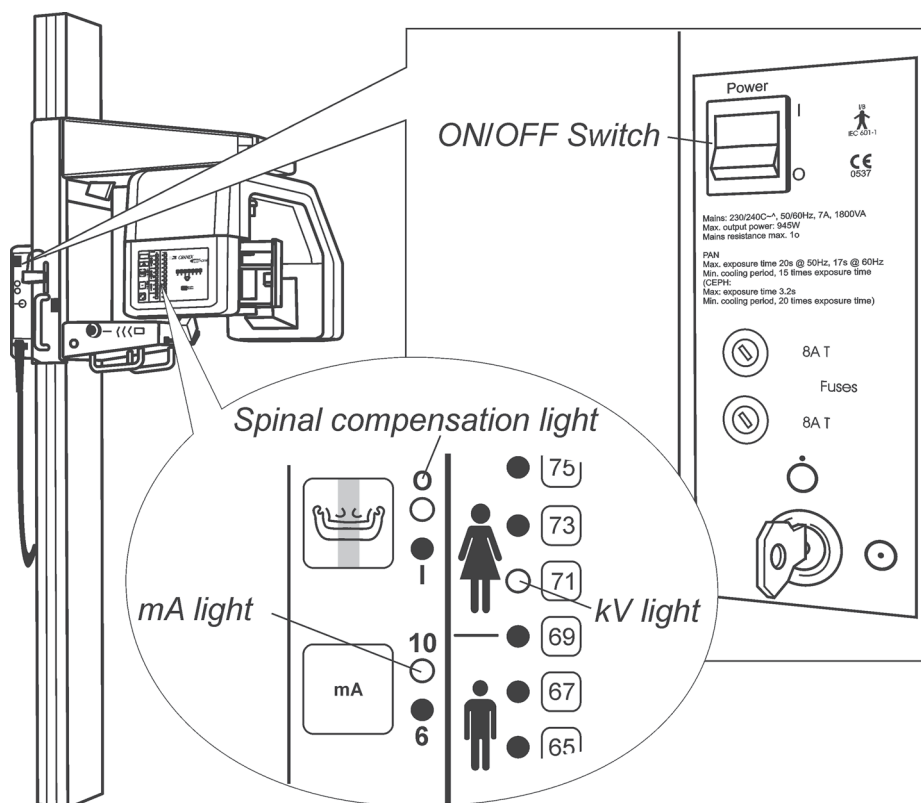
### Switching the unit on and off

The on/off switch is located on the side of the unit.

#### Switching the unit on

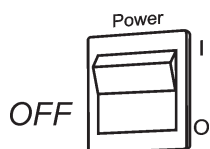
Press the on/off switch to the on position (I) to switch the unit on.

The on/off switch light and display lights for the preselected spinal compensation, **mA** and **kV** values will come on.



#### Switching the unit off

Press the on/off switch the off (O) position. All the lights will go out.

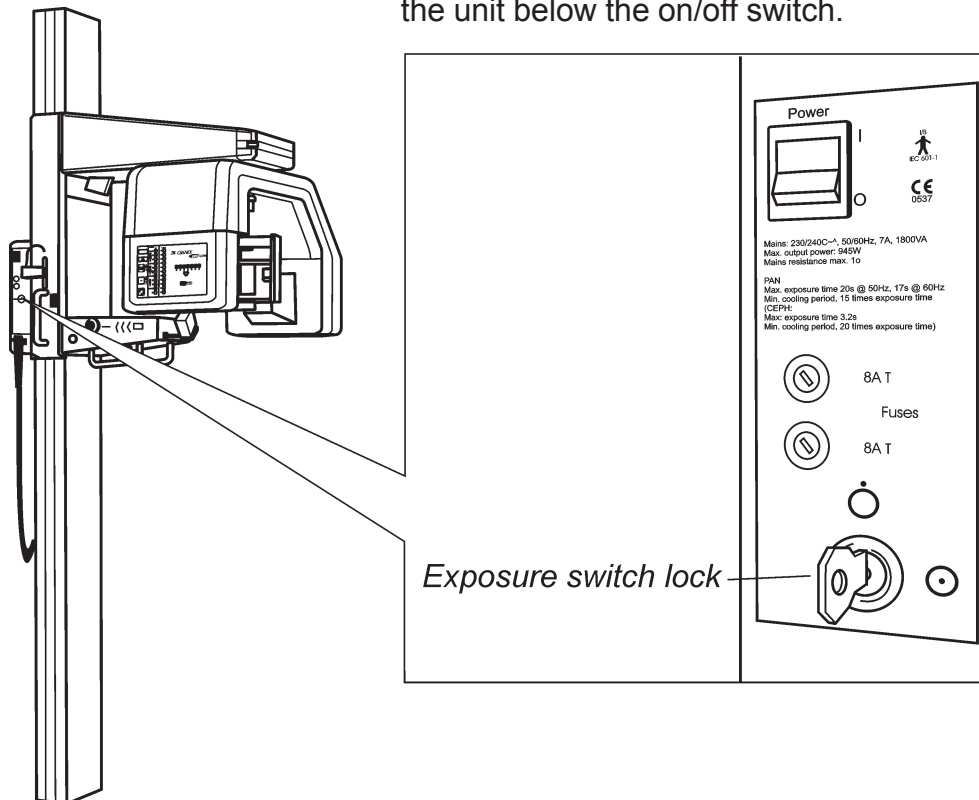


Switch the unit off at the end of every day or when it is not being used

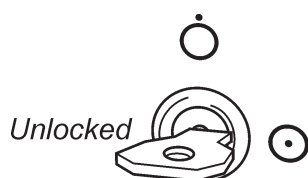
It is also recommended that the exposure switch (see next page) is locked when the unit is not being used.

## Exposure switch lock

The exposure switch lock allows the exposure switch to be locked. This prevents unauthorized people from taking exposures even if the unit is switched on. The exposure switch lock is located on the side of the unit below the on/off switch.



### Unlocking the exposure switch



Insert the key into the exposure switch lock and turn the key clockwise to the horizontal unlocked position.

### Locking the exposure switch

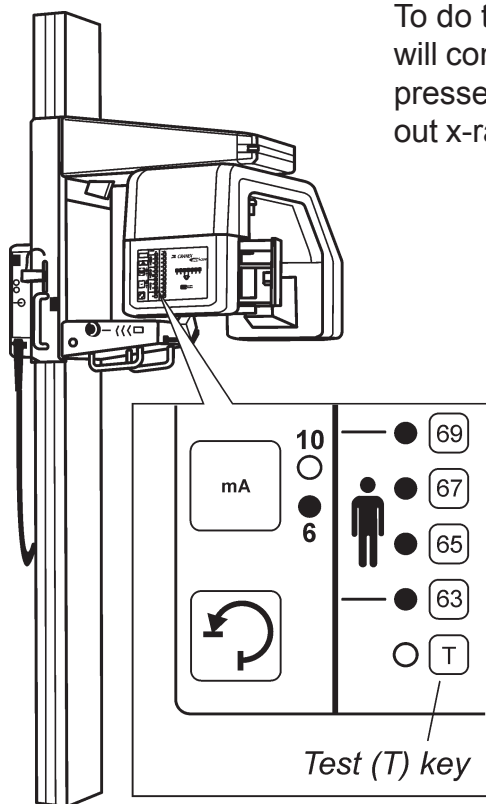


Turn the key anticlockwise to the vertical locked position and then remove the key.

## Operating the unit without x-rays

In some situations you may have to operate the unit without x-rays being generated.

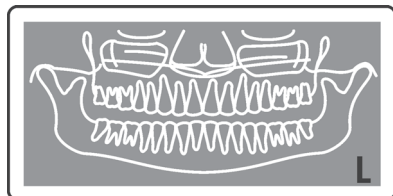
To do this, press the test (T) key, the indicator light will come on. The exposure switch can now be pressed to demonstrate how the unit operates without x-rays being generated.



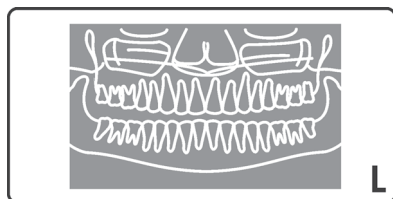
## Taking Panoramic exposures

### Panoramic exposure programs

The following images can be taken with the **Excel**, **Excel CEPH** and **BaseX**.



Full-width panorama  
Magnification 1.3

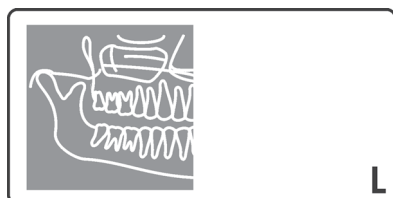


Reduced width panorama (-20%) pedo and sinus  
Magnification 1.3

The following images can only be taken with the **Excel** and **Excel Ceph**.



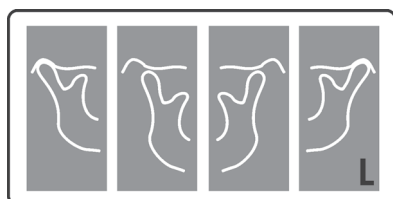
Frontal area of the mandible and maxilla  
**Excel and Excel Ceph only**  
Magnification 1.3



Right-hand side of the mandible and maxilla  
**Excel and Excel Ceph only**  
Magnification 1.3



Left-hand side of the mandible and maxilla  
**Excel and Excel Ceph only**  
Magnification 1.3

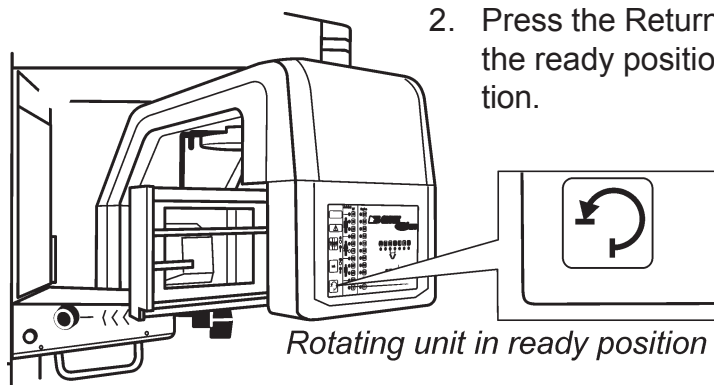


TMJ, two or four images on the film  
**Excel and Excel Ceph only**  
Magnification 1.3

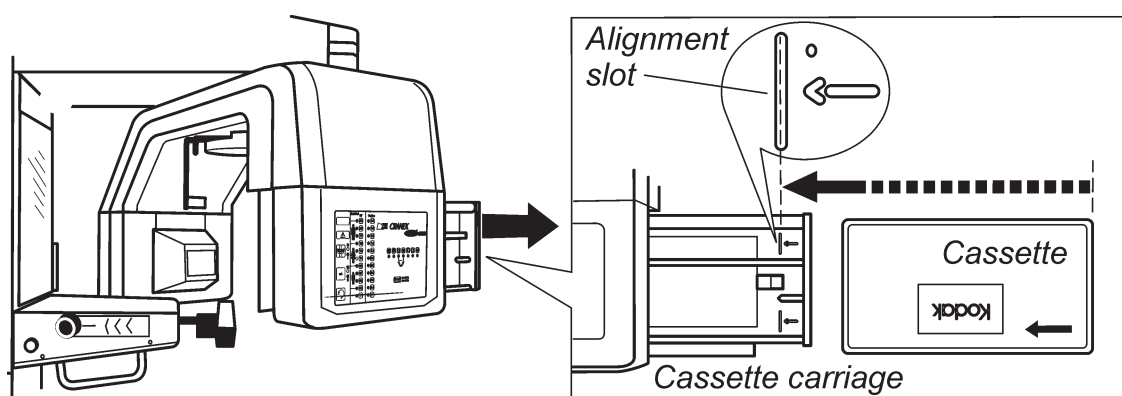
## Preparing the unit

1. Switch the unit on.

2. Press the Return key to drive the rotating unit to the ready position if it is not already in that position.



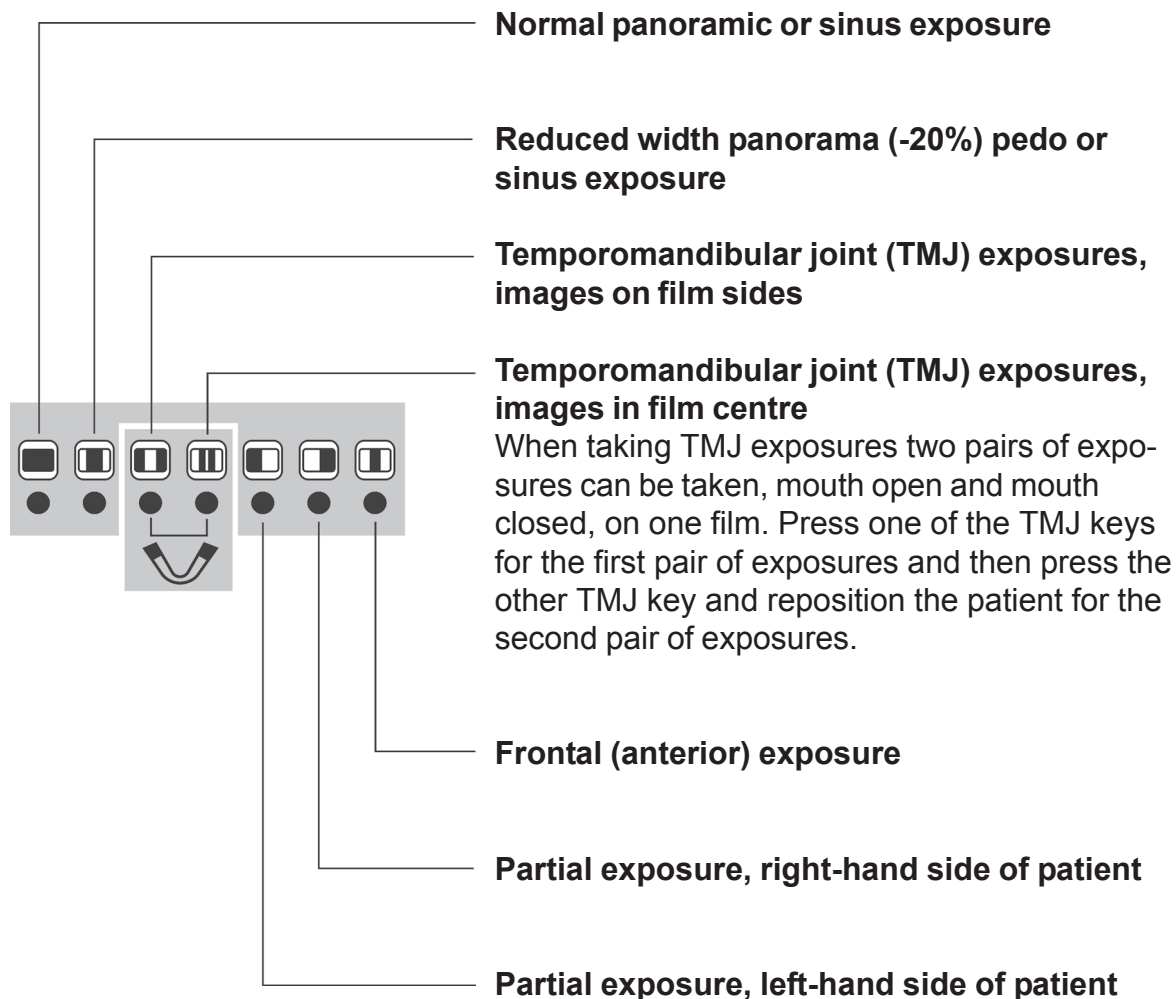
3. Push the cassette carriage to the right and then slide a cassette with film or a cassette with imaging plate into the cassette carriage. Slide the cassette in until the right-hand end of the cassette lines up with the two slots. Arrows indicate the position of the slots. Note that film cassettes and imaging plate cassettes are not the same and are NOT interchangeable.



4. Select the exposure program you require.

**Excel and Excel CEPH units only**

Press the appropriate program key. The program light will come on. The programs are as follows:





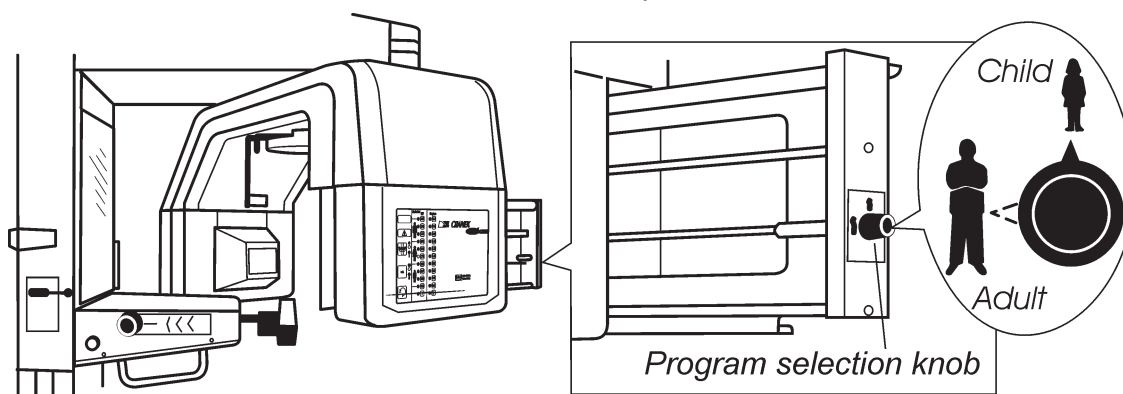
**BaseX only**

Turn the program selection knob on the side of the cassette carriage to select the required exposure program.

The programs are as follows:

**Adult** for normal panoramic or sinus exposure

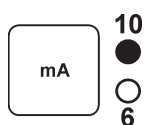
**Child** for Reduced width panorama (-20%) pedo or sinus exposure



5. Press the mA key to select the correct mA for the image receptor you are using.



Select **10 mA** for normal-speed film/screen combinations. Note that 10mA can be used with high-speed film/screen combinations, but the kV value will have to be **decreased** accordingly.



Select **6 mA** for high-speed film/screen combinations.

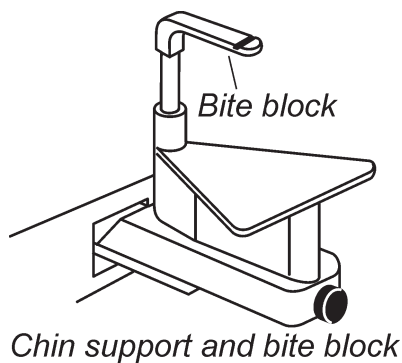
For imaging plates select an mA value for the required image quality and dose level.



6. If you are taking a panoramic exposure of an adult, press the spinal compensation button to activate spinal compensation. The "I" light will come on. With spinal compensation the mA is decreased in the lateral areas of the exposure.



If you are taking a panoramic exposure of a child, a sinus exposure or TMJ exposures, DO NOT activate spinal compensation. The "O" light must be on



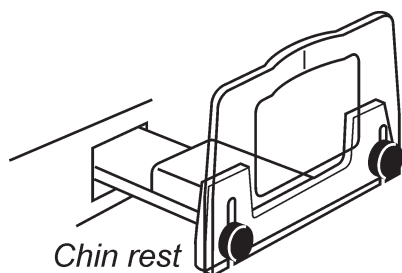
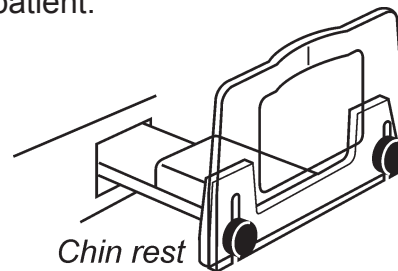
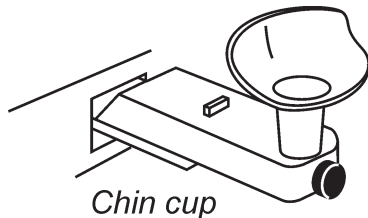
7. Select the chin support for the exposure you wish to take.

For **panoramic** exposures,

use the chin support and bite block

or if the patient is edentulous, the chin cup

or the chin rest if you cannot use either of the above with the patient.



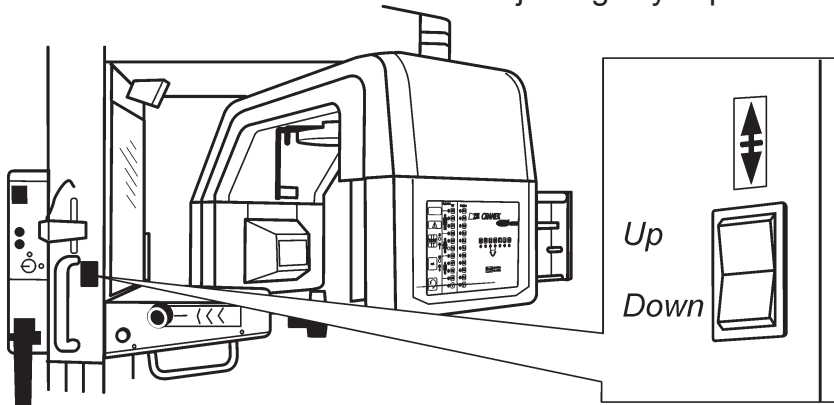
For **sinus and TMJ** exposures, use the chin rest.

**CAUTION:** Always use the disposable covers with the chin supports.

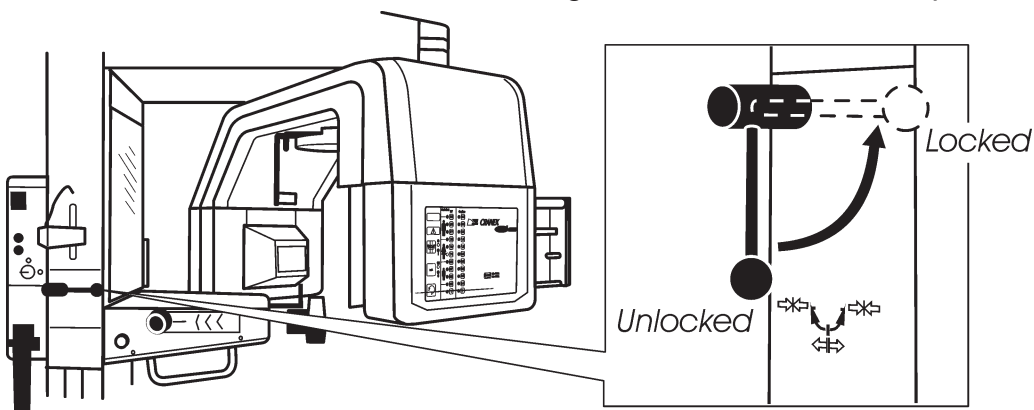
8. Ask the patient to remove any dentures, jewelry or spectacles and then place a lead apron over the patient's back.
9. Adjust the height of the chin rest so that it is level with the patient's chin.

**Excel and Excel CEPH**

With the Excel and Excel CEPH, press the height adjusting key to position the chin rest.

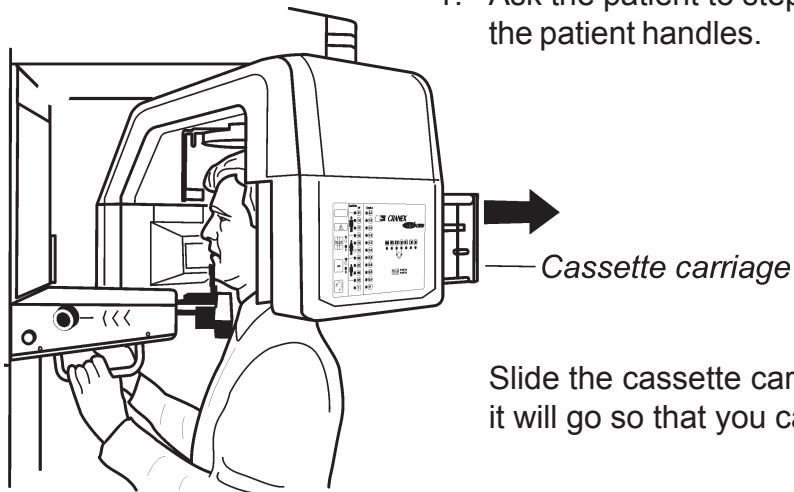
**BaseX**

With the BaseX, turn the locking lever downwards to unlock the chin rest. Adjust the position of the chin rest and then relock it by turning the locking lever back to the locked position.

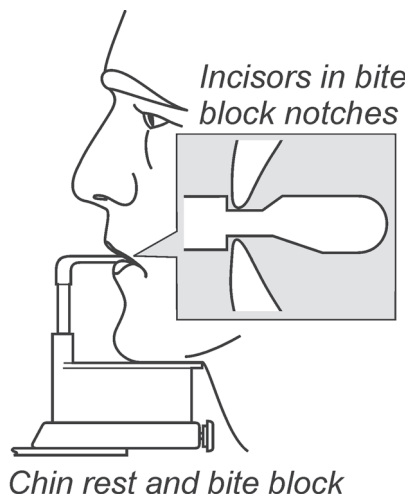


### Positioning the patient for a panoramic exposure

1. Ask the patient to step into the unit and grasp the patient handles.



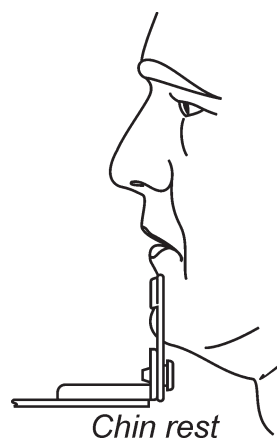
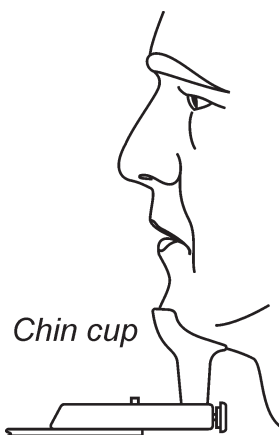
Slide the cassette carriage to the right as far as it will go so that you can see the patient.



2. If you are using the chin rest and bite block ask the patient to place his chin on the chin support and bite the bite block. Make sure that the patient's upper and lower teeth are positioned in the respective notches on the top and bottom of the bite block.

If you are using the chin cup ask the patient to position the upper and lower central incisors so that the biting edges are together.

If you are using the chin rest ask the patient to position the upper and lower central incisors so that the biting edges are together and then press his lower lip against the chin rest.

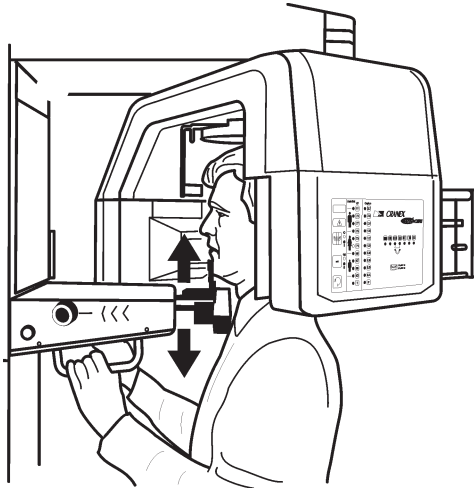


3. While the patient is holding the patient handles ask the patient to step forward a few centimetres so that patient is slightly off balance.

This movement will encourage the patient to push their head forward in order to maintain balance.

In this position the patient's cervical vertebrae will be stretched and straight and the patient will be in the best position for taking a panoramic exposure.

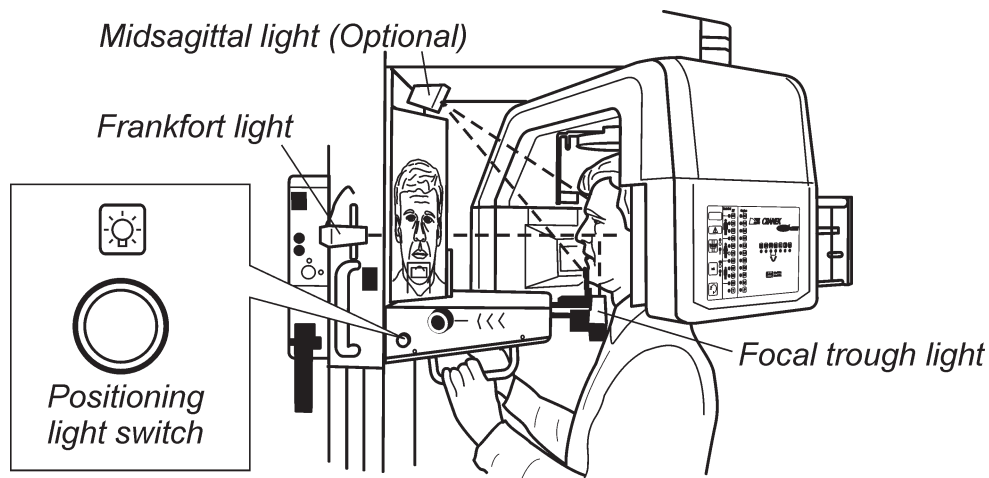
If necessary adjust the height of the chin rest to "stretch" the patient.



4. Open the mirror so that you can see a reflection of the patient in the mirror.



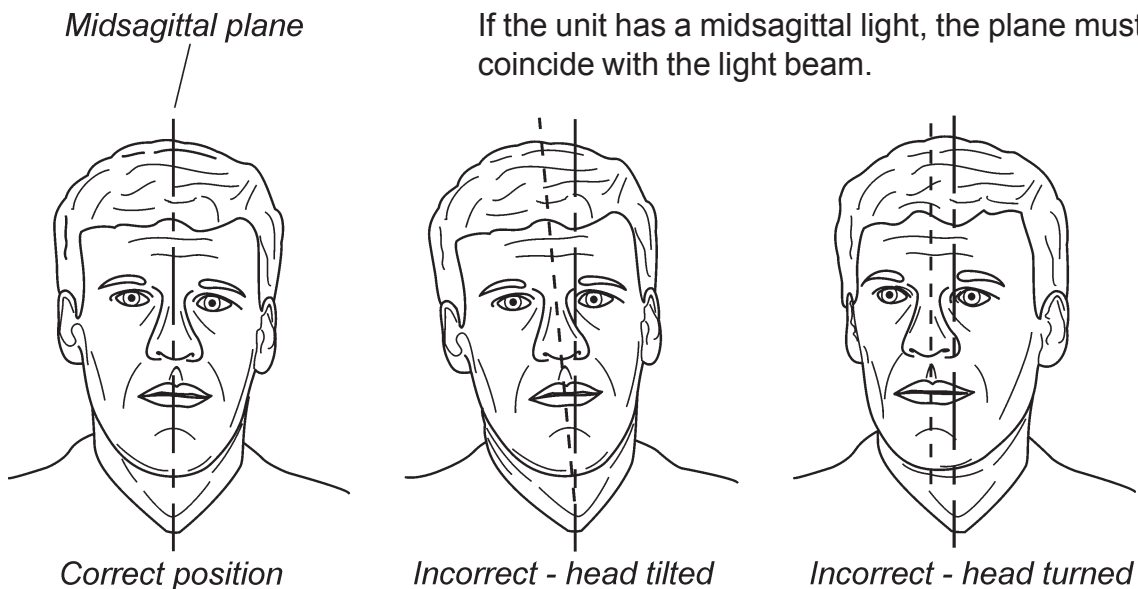
5. Press the positioning light button to switch the patient positioning lights on. The lights will remain on for 30 seconds. If you need more time, press the button again.



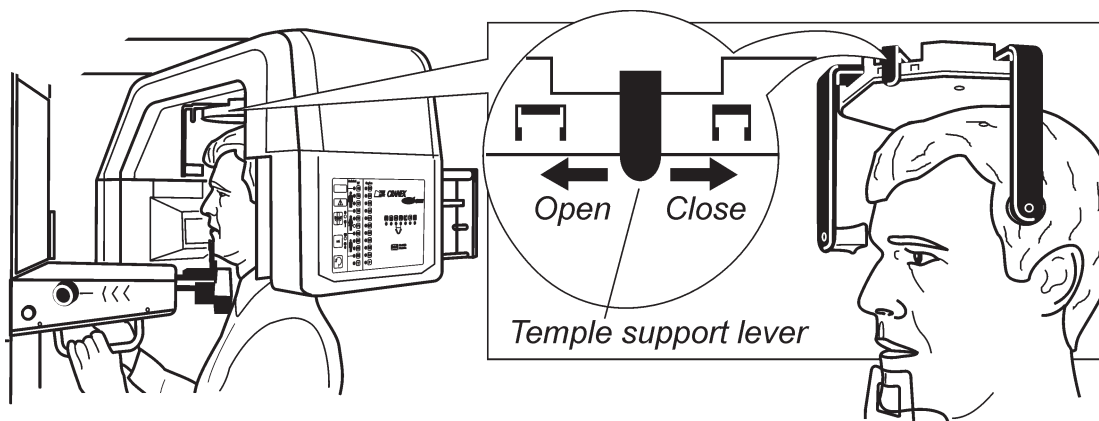
6. Look at the reflection of the patient in the mirror and position the **midsagittal plane** of the patient so that it is vertical. The patient's head must be positioned symmetrically and the patient must be looking straight ahead.

The patient's head is not tilted or turned to one side.

If the unit has a midsagittal light, the plane must coincide with the light beam.



7. Close the temple supports by pushing the temple support lever to the right.

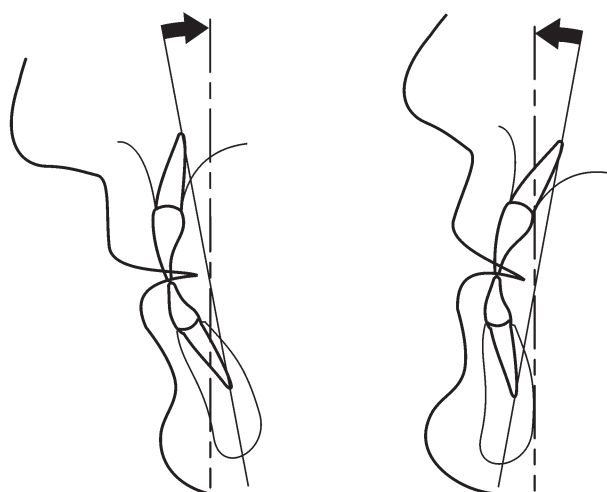
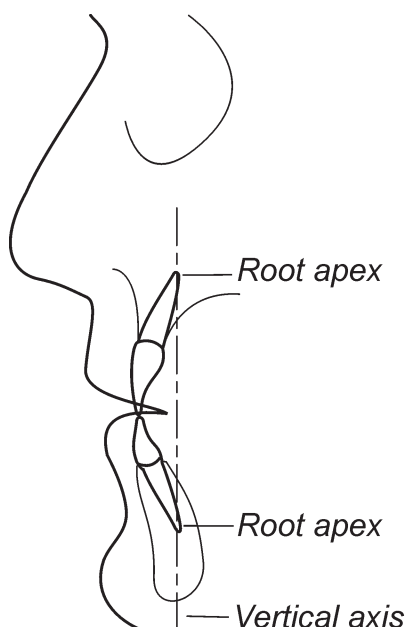


#### NOTE

When the temple supports are closed the patient's head is automatically "measured". This "measurement" will be used to determine a kV value when the unit is readied for an exposure.

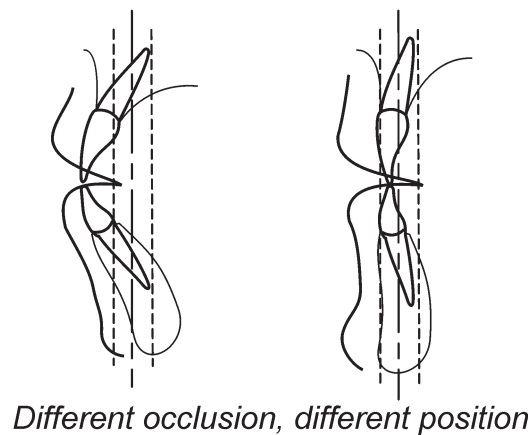
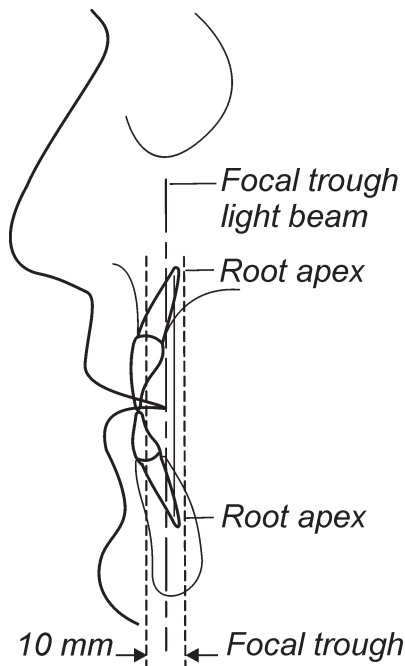
8. Ask the patient to open his lips so that you can see his teeth. Estimate the positions of the root apices of the central upper and lower front incisors.

Adjust the tilt of the patient's head, by raising or lowering the chin support, so that both root apices are on the same vertical axis.



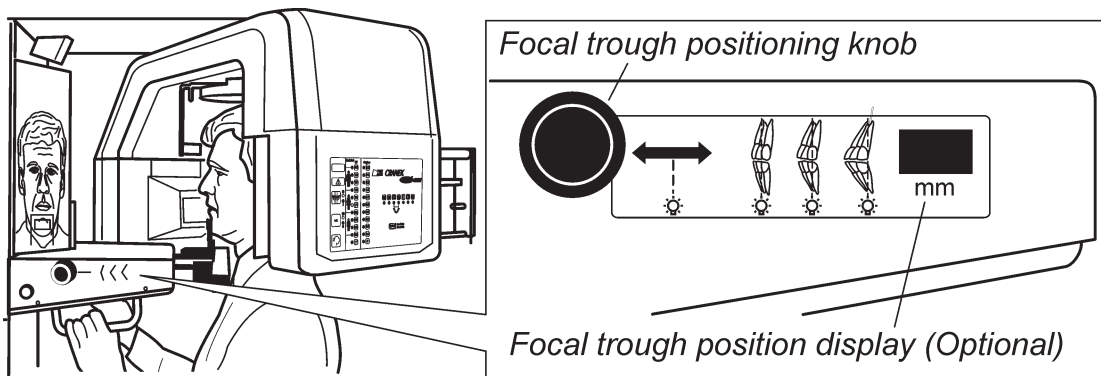
*Tilt head to position root apices*

9. The focal trough light beam indicates the **center** of the focal trough, which is 10 mm wide at the front. The root apices of the central upper and lower front incisors must now be positioned so that they are within the focal trough.



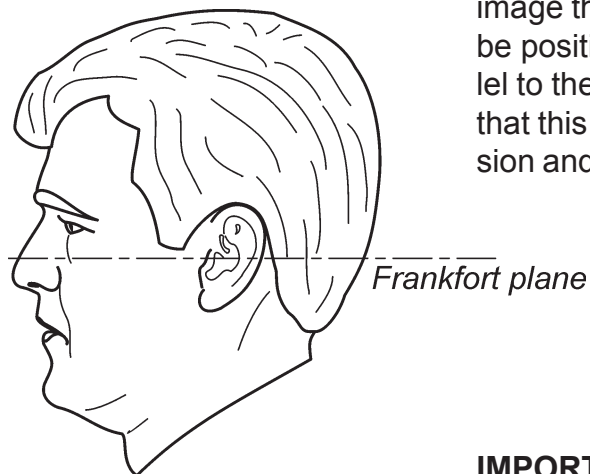
To do this, rotate the focal trough positioning knob backwards or forwards until the root apices of the central upper and lower front incisors are within the focal trough.

For patients with NORMAL occlusion the focal trough light beam will be positioned between the second and third teeth.



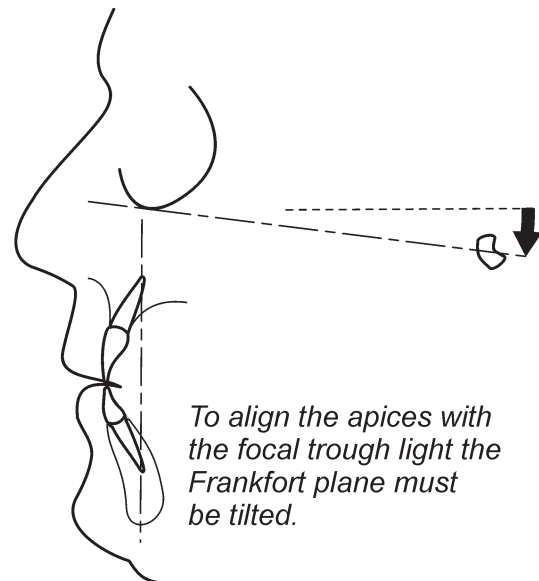
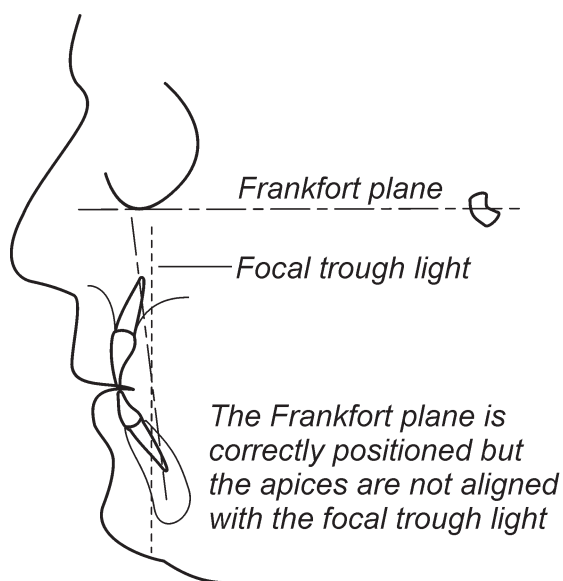


10. For the dental arch to appear correctly on the image the Frankfort plane of the patient should be positioned so that it coincides with or is parallel to the Frankfort plane light. Note however, that this is only for patients with NORMAL occlusion and is only a very rough guide.

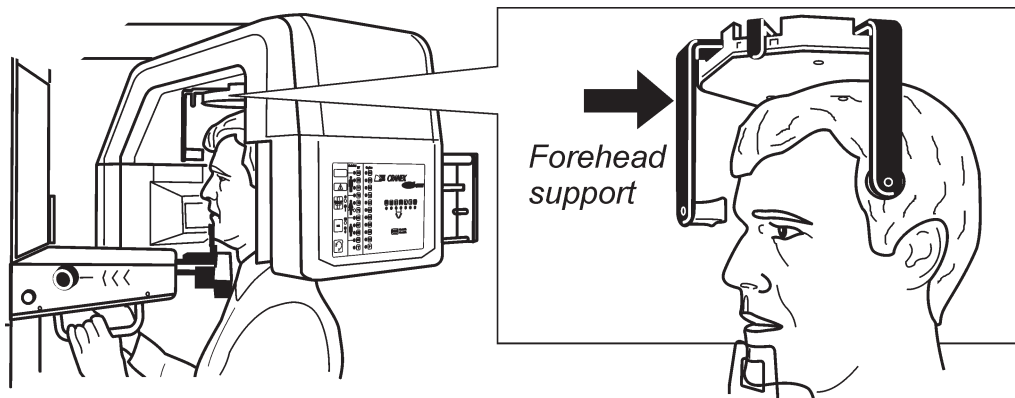


### IMPORTANT NOTE

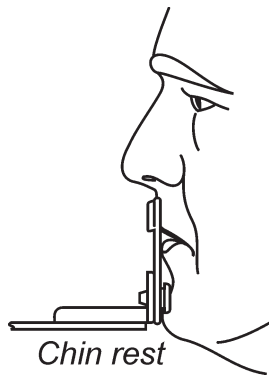
The most important factor in patient positioning is the position of the upper and lower apices of the central incisors. They **MUST** be positioned within the focal trough even if it means ignoring the position of the Frankfort plane.



11. Slide the forehead support towards the patient until it touches the patient's forehead.

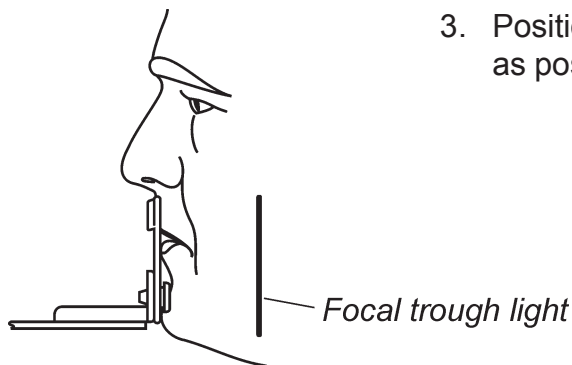


### Positioning the patient for a Sinus exposure

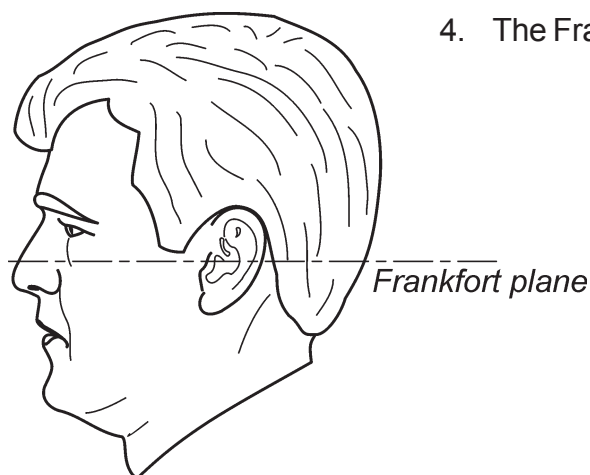


1. For sinus exposures use the chin rest.  
Ask the patient to press his upper lip against the chin rest.

2. The midsagittal plane is positioned the same as for a panoramic exposure.

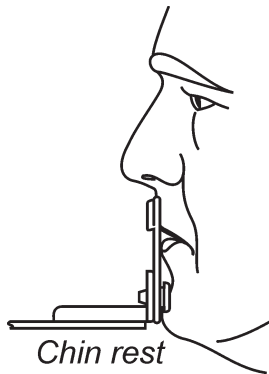


3. Position the focal trough light as far backwards as possible.



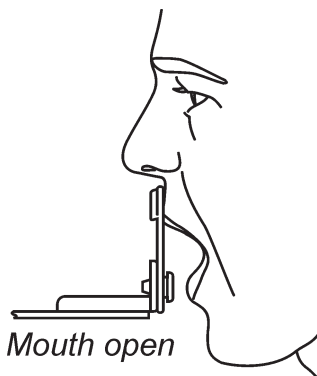
4. The Frankfort plane must be horizontal.

## Positioning the patient for TMJ exposures (Excel and Excel CEPH only)



1. For TMJ exposures use the chin rest.  
Ask the patient to press his upper lip against the chin rest with his mouth closed.

2. The midsagittal plane is positioned the same as for a panoramic exposure.
3. The focal trough is positioned the same as for a panoramic exposure.
4. The Frankfort plane must be horizontal.

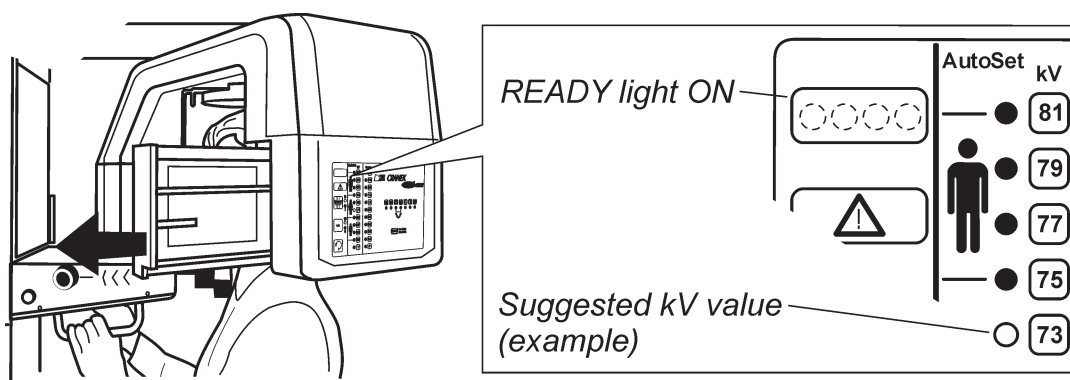


5. After taking the first pair of TMJ exposures ask the patient to open his mouth for the second pair of exposures.

## Taking an exposure



1. Make sure that the temple supports are closed so that they are holding the patient's head. Press the RETURN key to drive the rotating unit to the start position.
2. Manually slide the cassette carriage to the left as far as it will go. The READY light will come on and a kV value based on the patient's head size will be automatically selected.

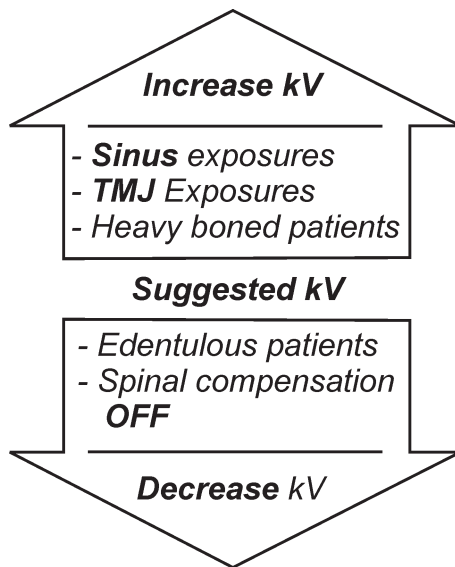


This kV value is for a **normal panoramic** exposure with spinal compensation ON, using 10mA and a normal-speed film/screen combination.

### IMPORTANT NOTE

The AutoSet kV value selected is only a **SUGGESTED** value based upon the size of the patient's head. You should always use your own experience and knowledge when deciding what kV value to use.

If a high-speed film/screen combination is being used, decrease the kV value by 6 - 8 kV or use 6 mA instead of 10 mA.



For different exposure programs and patients adjust the suggested kV value as follows:

- **sinus** exposure (spinal compensation OFF), increase the kV value by 4 - 6 kV.
- **TMJ** exposure (spinal compensation OFF), increase the kV value by 2 - 4 kV.
- **panoramic** exposure heavy boned patient, increase the suggested value by 2 - 4 kV
- **panoramic** exposure of an edentulous patient, decrease the suggested value by 2 - 4 kV.
- **panoramic** exposure WITHOUT spinal compensation, decrease the suggested value by 2 - 4 kV.

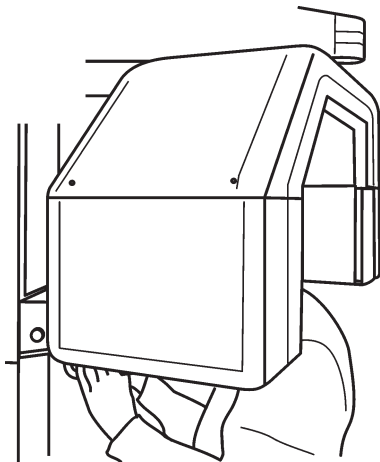
If you cannot increase or decrease the kV value by the number of kV required, just select the highest or lowest kV value possible.

Note that when using film, the age of the processing chemicals and the film/screen combination being used may also require the kV value to be adjusted.

3. Ask the patient to press his tongue against his palate, breathe normally and not move until the exposure has been completed.  
Exposures last approximately 20 seconds.
4. Move at least two metres away from the x-ray unit and protect yourself from radiation. Make sure that you are able to see and hear the patient during the exposure.



5. Press and hold down the exposure switch on the remote control for the duration of the exposure. During the exposure cycle you will hear an audible signal and the radiation warning lights will come on when radiation is generated.



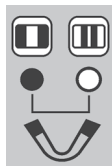
6. When the rotating arm stops moving and the exposure warning lights go out, remove your finger from the exposure switch.

**NOTE****TMJ Exposures (Excel and Excel CEPH only)**

If you are taking TMJ exposures:



Press the RETURN key after you have taken the first pair of exposures to drive the rotating unit back to the ready position.



Press the second TMJ exposure key.

Reposition the patient for the second pair of TMJ exposures (Refer to the section "Positioning the patient for a TMJ exposure") and then take these exposures as described above.

**NOTE**

When taking TMJ exposures, the audible signal and the radiation warning lights will **ONLY** come on when radiation is generated.

**After exposure**

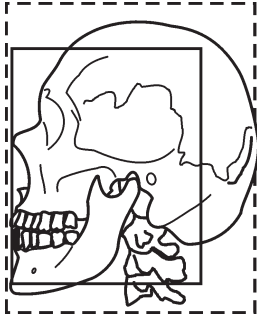
1. Slide the forehead support away from the patient.
2. Open the temple supports.
3. Guide the patient out of the x-ray unit.
4. Remove the cassette from the cassette carriage.  
Process the film or if you used an imaging plate,  
scan the imaging plate.



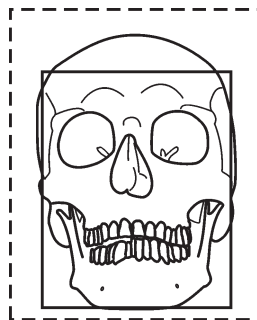
## Taking Cephalometric exposures (Excel CEPH only)

### Cephalometric exposure programs

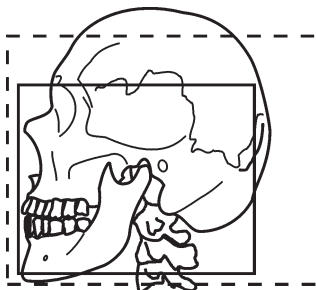
Only the Excel CEPH can also be used to take the following cephalometric images.



Lateral asymmetric vertical  
18 x 24 cm / 8" x 10"  
or optionally 24 x 30 cm



Anterior-posterior or posterior anterior symmetric  
vertical  
18 x 24 cm / 8" x 10"  
or optionally 24 x 30 cm



Lateral horizontal  
18 x 24 cm / 8" x 10"  
or optionally 24 x 30 cm

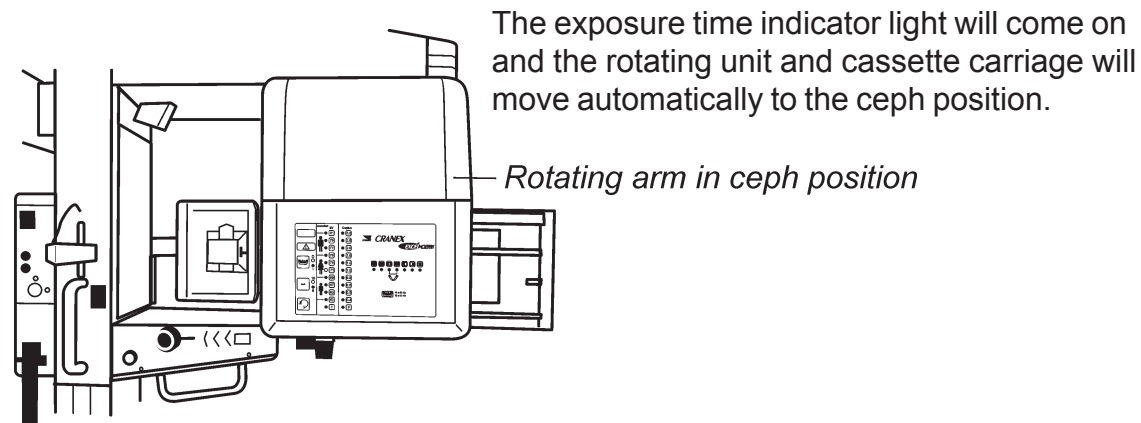
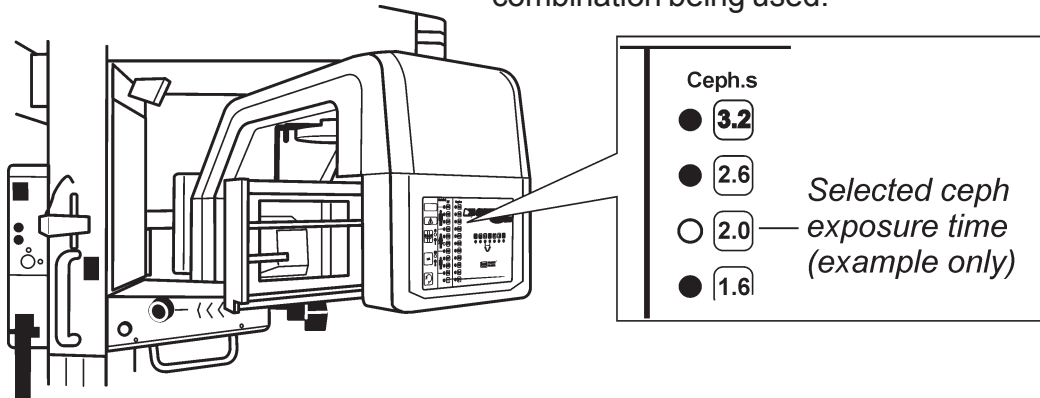
The magnification of all these images is 1.13.  
(NOTE: For non US units the magnification can be set between 1.09 and 1.13 during installation. )

## Taking a cephalometric exposure

1. Select and press the ceph exposure time button for patient you are taking an exposure of:
  - For adults **1.0 - 2.0** seconds
  - For children **0.4 - 1.0** seconds

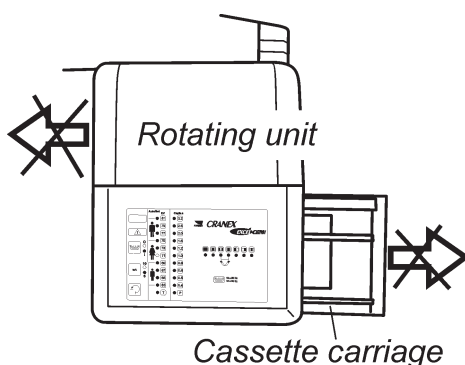
### Note

The exposure time will depend on the film/screen combination being used.



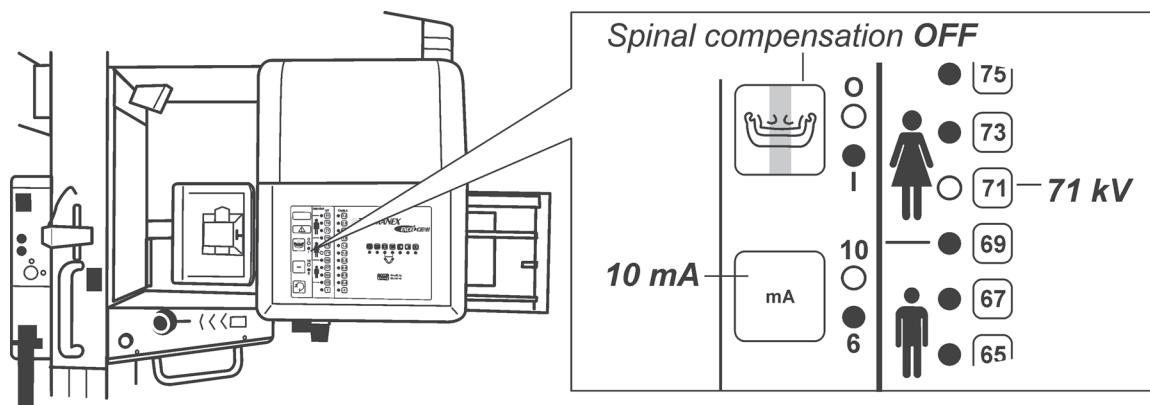
### CAUTION

DO NOT pull the cassette carriage out past its stop position. If pulled out too far the unit will **NOT** take a ceph exposure. If accidentally pulled out, push the cassette carriage in as far as it will go and it will then return automatically to the correct position.

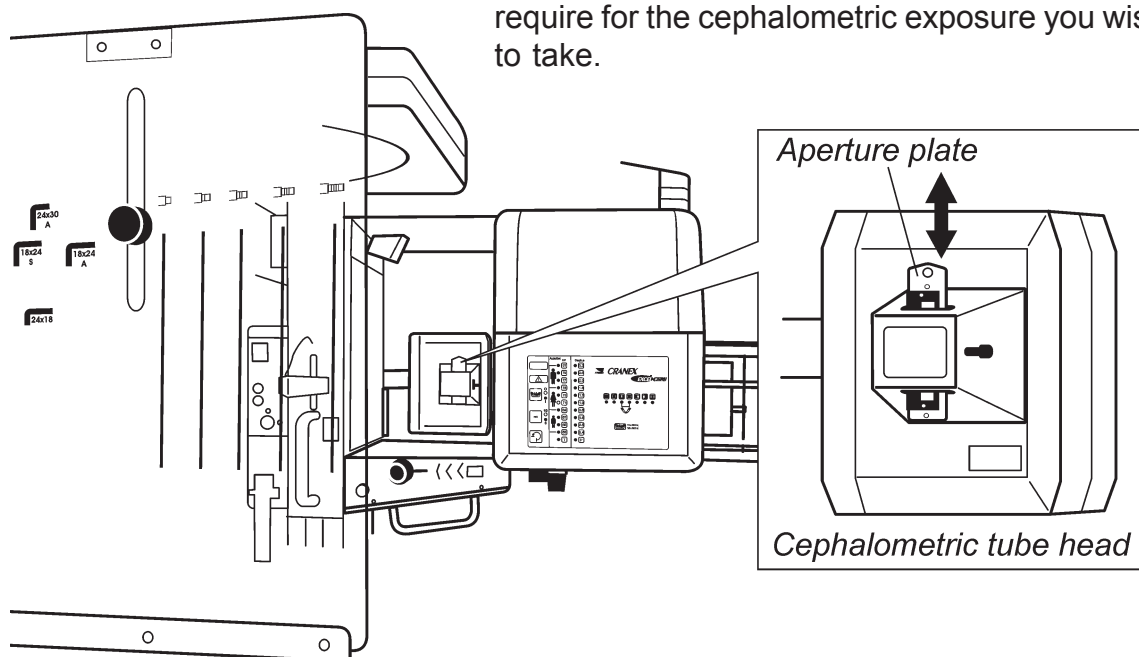


DO NOT push the rotating arm to the left. If pushed, it will start rotating. If the rotating arm is accidentally pushed and it starts to move, pull it to the right passed the ceph position and it will move automatically back to the ceph position.

2. Select **10 mA**, a kV value of at least **71 kV** and switch spinal compensation **OFF** (0).



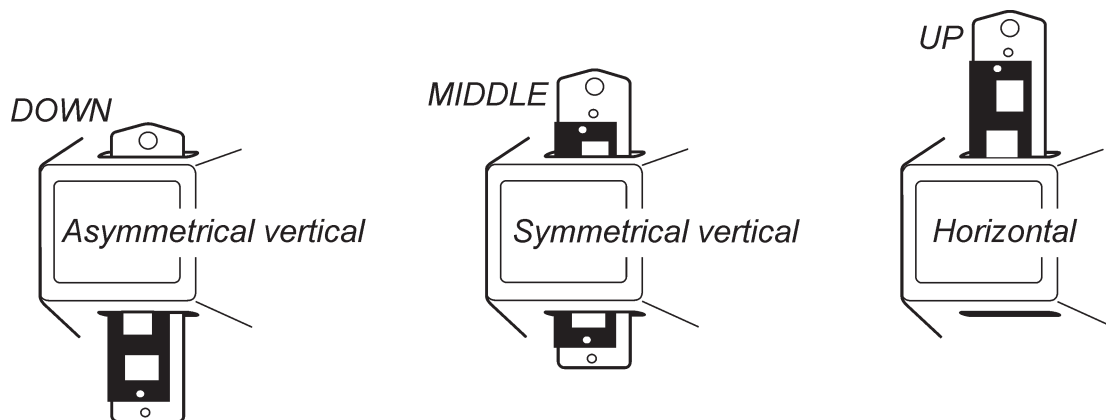
3. Slide the aperture plate to the aperture you require for the cephalometric exposure you wish to take.



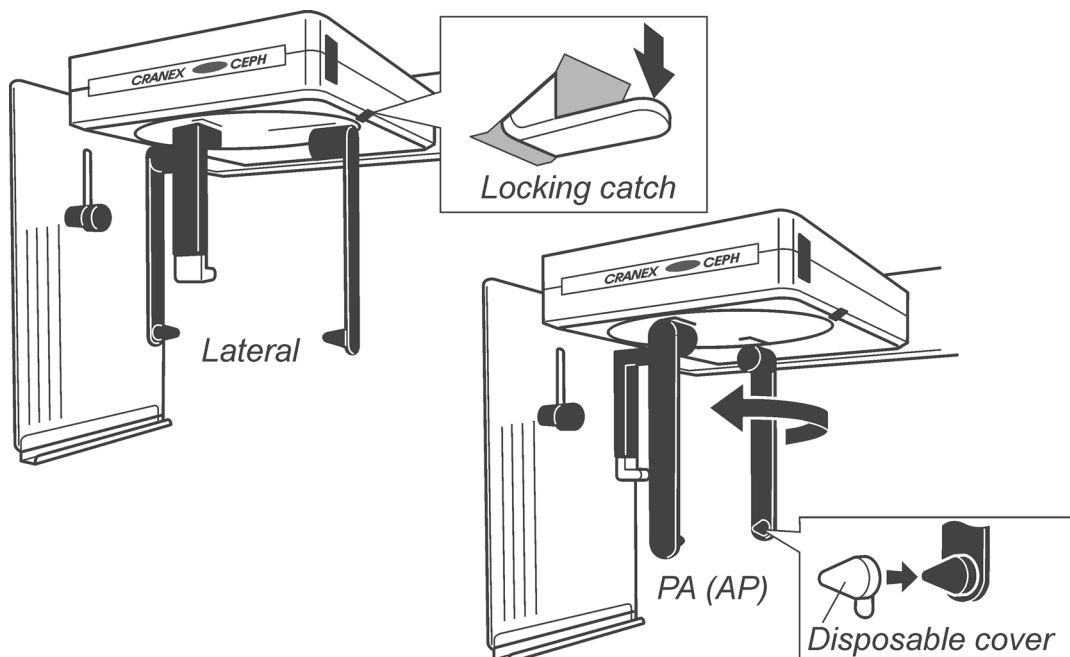
For a **lateral exposure** using the cassette in the **asymmetrical vertical** position slide the aperture plate to the **DOWN** position.

For a **PA or AP exposure** using the cassette in **symmetrical vertical** position slide the aperture plate to the **MIDDLE** position.

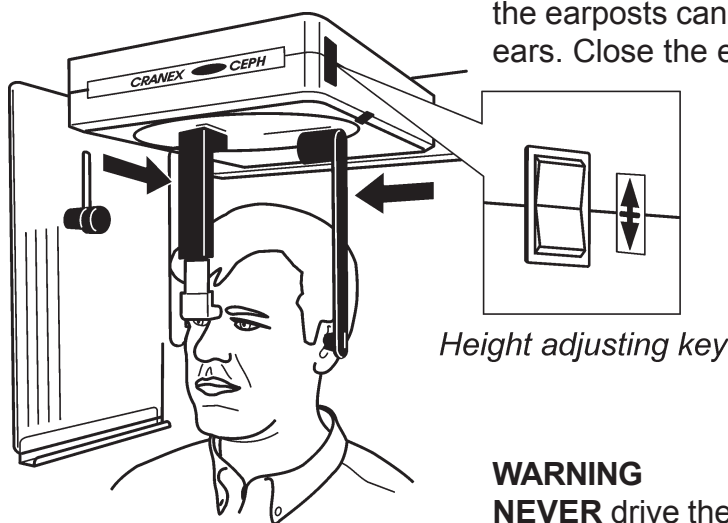
For a **lateral exposure** using the cassette in the **horizontal** position slide the aperture plate to the **UP** position.



4. Pull the locking catch down and then rotate the headrest until it is in the correct position for the cephalometric exposure you plan to take. Also place disposable covers over the ear posts.

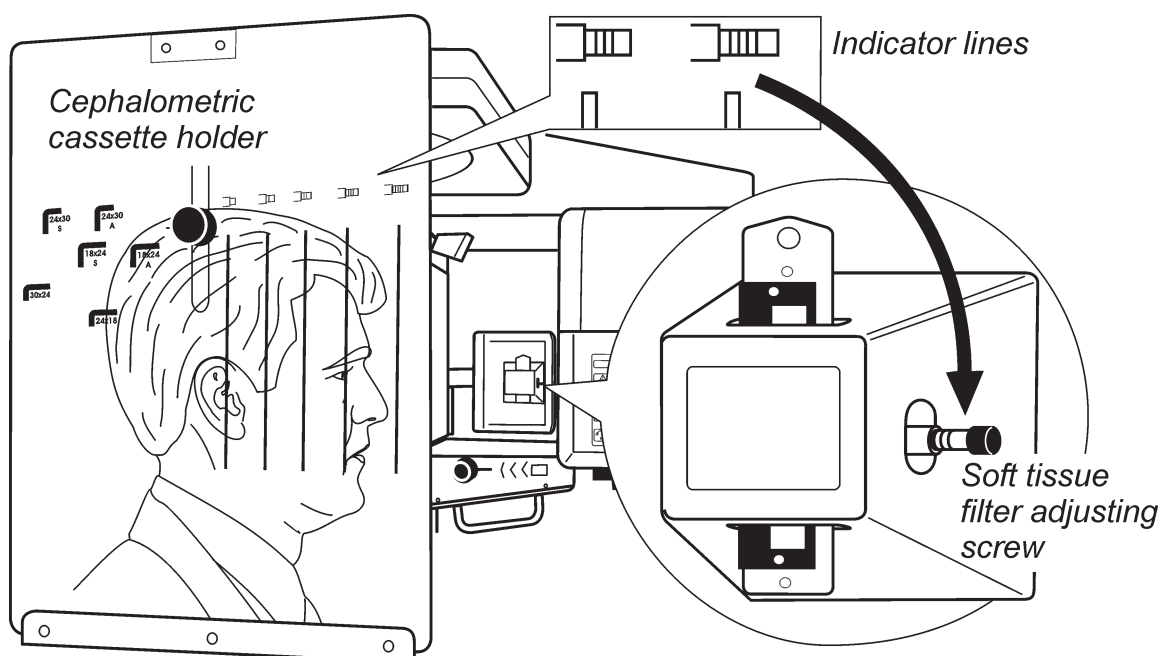


5. Ask the patient to stand between the open ear posts. Adjust the height of the head support until the earposts can be inserted into the patients ears. Close the ear supports.

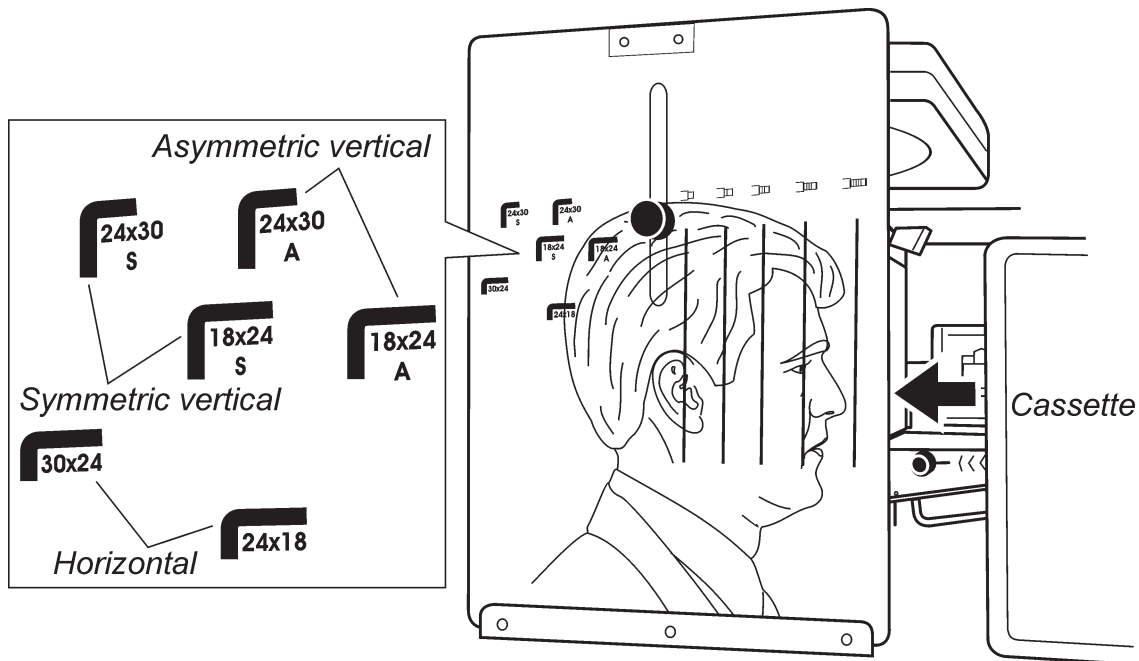
**WARNING**

**NEVER** drive the ceph head support up or down when the earposts are in the patient's ears.

6. If you are taking a lateral exposure and require soft tissue filtering, determine which of the soft tissue indicator lines on the cephalometric cassette holder is nearest to the patients nasion. Rotate the soft tissue filter adjusting screw until the position line on the screw is the same as the line chosen on the ceph cassette holder.

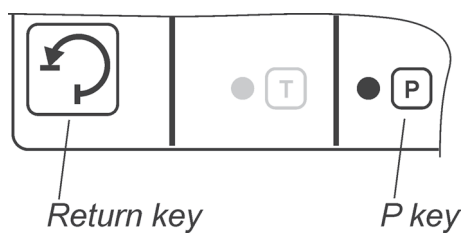


7. Slide the cephalometric cassette into the cassette holder until it lines up with the cassette positioning mark for the exposure you wish to take.



8. If you are taking an AP exposure, ask the patient to close his eyes. Protect yourself from radiation and take the exposure.
9. Guide the patient out of the unit.
10. Remove the cassette and process the film or scan the imaging plate.

11. To drive the rotating arm back to the panoramic position press the P key and then the RETURN key.



## 4. Care and Maintenance

### Cleaning the unit

**WARNING**

Switch the unit off before cleaning it.

**Painted surfaces**

All painted surfaces can be wiped clean with a soft cloth dampened with a mild detergent. NEVER use abrasive cleaning agents or polishes on this equipment.

**Positioning mirror and light lenses**

The positioning mirror and positioning light lenses are made of glass. Use a soft cloth dampened with a mild detergent. NEVER use abrasive cleaning agents or polishes.

**Surfaces that the patient comes into contact with**

All surfaces and parts that the patient touches or comes into contact with must be disinfected after each patient.

**If you need to clean the intensifying screens, only use cleaners recommended by the screen manufacturer.**

**If you need to clean the imaging plates, only use cleaners recommended by the imaging plate manufacturer.**



## Monitoring the operation of the unit

If any of the unit's controls or functions fail to operate or do not operate in the way described in this manual, switch the unit off, wait 30 seconds and then switch the unit on again. If the unit still does not operate correctly contact your service technician for help.

If you hear the exposure warning tone but the exposure warning light does not come on when an exposure is taken, stop using the unit and contact your service technician for help.

If you do not hear the exposure warning tone when an exposure is taken, stop using the unit and contact your service technician for help.

## Maintenance

### Yearly

Once a year an authorized service technician must carry out a full inspection of the unit. During the inspection the following will be carried out:

- a kV/mA test
- a ceph exposure time test (where applicable)
- a beam alignment test
- a ball/pin test
- a check to see that the safety ground is connected
- a check to see that the positioning lights operate
- a check to see that the tube head is not leaking
- a check to see that all covers and mechanical parts are correctly secured and have not come loose.

A full description of all the tests and checks is described in the Service Manual.

## Troubleshooting

### Problem

The protection light comes on and you are unable to take an exposure.

### Cause

There is a problem with the generator.

### Solution

Switch the unit off. After a few seconds switch it on again. If the light comes on again, contact your dealer for assistance.

## 5. Technical specifications

### Classification

Complies with IEC class I type B, IPX0

Complies with IEC 601-1, IEC 601-2-7 and EN 55011 standards

Group 1, class B

Complies with DHHS Radiation Performance Standard, 21CFR Subchapter J.

The unit must be installed in a protected clinical environment.

### Description

Dental panoramic and panoramic/cephalometric x-ray units with a high frequency switching mode x-ray generators. The panoramic version takes panoramic exposures. The panoramic/cephalometric version takes panoramic and cephalometric exposures and uses a dedicated x-ray source to take cephalometric exposures.

### Generator

#### TUBE

- OPX/105, DE 100/15 or equivalent

#### FOCAL SPOT

- 0.5 mm IEC 336

#### TARGET ANGLE

- 5°

#### TARGET MATERIAL

- Tungsten

#### OPERATING TUBE POTENTIAL

- Panoramic 63 - 81 kV ( $\pm 5$  kV) at preselected settings

#### OPERATING TUBE CURRENT

- 6 mA and 10 mA ( $\pm 1$  mA) at preselector,  
4.5 mA and 6 mA or 7.5 mA and 10 mA in compensation mode

#### MAXIMUM TUBE CURRENT

- 11 mA

#### MAXIMUM OUTPUT POWER

- 945 W nominal

#### FILTRATION

- minimum filtration 2.5 mm Al

#### BEAM QUALITY

- HVL over 2.5 mm Al at 81 kV

#### OUTER SHELL TEMPERATURE

- +50°C (122°F) maximum

#### DUTY CYCLE

- Panoramic: 1:15, 81 kV/10mA  
- Cephalometric: 1:20, 81 kV/10mA

**Power requirements**

## INPUT VOLTAGE

- 175-250 VAC ( $\pm 10\%$ ), 50/60 Hz, adjustable, single phase, grounded socket

## MAXIMUM LINE CURRENT

- 7 A at 81 kV/10mA

## MAXIMUM LINE RESISTANCE

- 1 ohm

## MAXIMUM LINE FUSING

- 10 A slow (main fuse 8A slow in device)

## LINE SAFETY SWITCH (when required)

- Approved type, min. 10 A 250 VAC

## EARTH LEAKAGE CIRCUIT BREAKER (when required)

- Approved type, min. 16 A 250 VAC, breaker activation leakage current in accordance with local regulations.

**Mechanical parameters**

## PANORAMIC

- SID 520 mm ( $\pm 10$  mm)
- Magnification factor 1.3

## CEPHALOMETRIC

- SID 1635 - 1700 mm  $\pm 20$  mm
- SID, USA only, fixed 1700 mm  $\pm 20$  mm
- SOD (Source object distance) 1500
- Magnification factor 1.09 - 1.13 (Non US unit, set during installation)
- Magnification factor, USA only, fixed 1.13

## WEIGHT

- Panoramic unit 150 kg (330 lb.)
- Pan Ceph unit 195 kg (430 lb.)

## DIMENSIONS

- Panoramic unit (HxWxD) 2240 x 1200 x 970 mm (88" x 47" x 38")
- Pan Ceph unit (HxWxD) 2240 x 1200 x 1850 mm (88" x 47" x 74")

## VERTICAL HEIGHT OF CHIN REST

- 850-1700 mm (33"-67")

**Cassettes**

## PANORAMIC

- 15 x 30 cm (6" x 12") Optional 24 x 30 cm (10" x 12") available

## CEPHALOMETRIC

- 18 x 24 cm (8" x 10")
- optionally 24 x 30 cm

**Recommended image receptors**

## FILM/SCREEN COMBINATIONS

Kodak T-MAT G (green sensitive) - Kodak Lanex Regular and Medium

## IMAGE PLATES

All types of imaging plates intended for extraoral imaging.

**Timer**

## PANORAMIC EXPOSURE TIMES:

|        | 50 Hz                      | 60 Hz                      |
|--------|----------------------------|----------------------------|
| Normal | 19 s ( $\pm 15\%$ )        | 16 s ( $\pm 15\%$ )        |
| Child  | 17 s ( $\pm 15\%$ )        | 14 s ( $\pm 15\%$ )        |
| Sides  | 11 s ( $\pm 15\%$ )        | 9 s ( $\pm 15\%$ )         |
| Middle | 10 s ( $\pm 15\%$ )        | 8 s ( $\pm 15\%$ )         |
| TMJ    | 3.3 + 3.3 s ( $\pm 15\%$ ) | 2.8 + 2.8 s ( $\pm 15\%$ ) |
|        | Max 240 mAs                | Max 202 mAs                |

## CEPHALOMETRIC EXPOSURE TIMES:

- 0.4 - 3.2 s ( $\pm 15\%$ ), ten steps in accordance with R' 10, series (ISO)
- 4 mAs - 32 mAs nominal, maximum 40.4 mAs

## BACK-UP TIME

- 23.5 s ( $\pm 1.5$ s)

**Leakage technique factors**

## PANORAMIC

- 81 kV, 2400 mAs/h (81 kV, 10 mA, duty cycle 1:15)
- (One normal exposure per 4 minutes cool-down period)

## CEPHALOMETRIC

- 81 kV, 1800 mAs/h (81 kV, 10 mA, duty cycle 1:20)
- (One 3.2 s exposure per 1 minute cool-down period)

### Measurement bases

- The kV is measured by monitoring the current flowing through a 450 Mohm, 1% feedback resistor connected between the tube anode and ground.
- The mA is measured by monitoring current in the HT return line, which equals the tube current.
- Both parameters are measured using a Soredex kV/mA meter (pt. no. 4800177) or with a digital multimeter (DMM) according to a specified procedure. The exposure time is measured using a radiation probe positioned in the primary beam.

### Cephalometric collimator

18 x 24 A or 24 x 18 A for lateral projection,  
18 x 24 S for P.A. and A.P. projections  
24 x 30 aperture optional

8" x 10" A or 10" x 8" A for lateral projections  
8" x 10" S for A.P. and P.A. projections

Adjustable soft tissue filter for lateral projection

### Operating Room Temperature

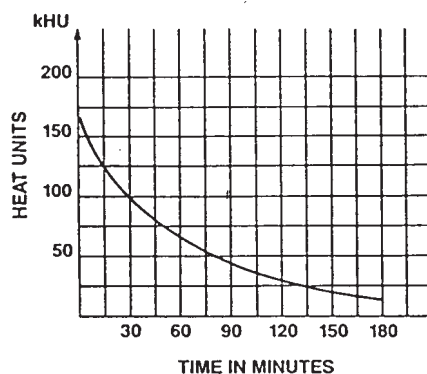
- 15°C (59°F) to 32°C (90°F)

### Operating Relative Humidity Maximum

- 95%

### Tube housing assembly cooling characteristics

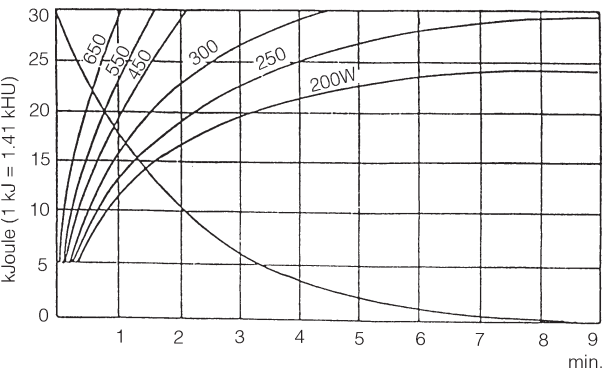
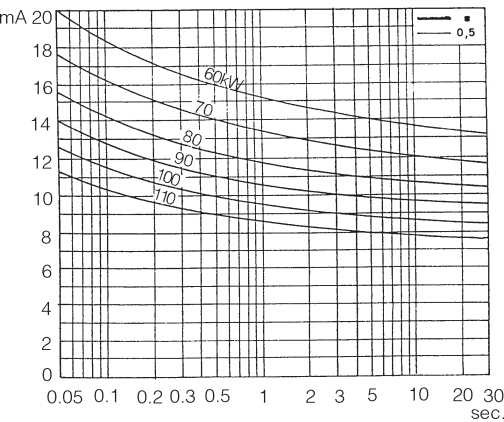
TUBE HOUSING ASSEMBLY COOLING CHARACTERISTICS



Tube rating chart

Anode thermal characteristics

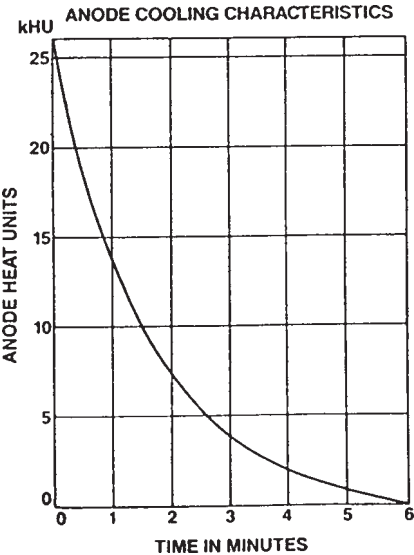
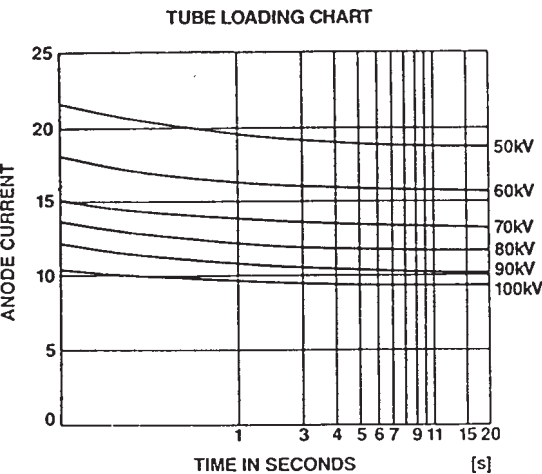
OPX/105



Tube rating chart

Anode thermal characteristics

DE 100/15 ö



**Unit dimensions**